ELECTRICAL WEST

WITH WHICH IS CONSOLIDATED
THE JOURNAL OF ELECTRICITY

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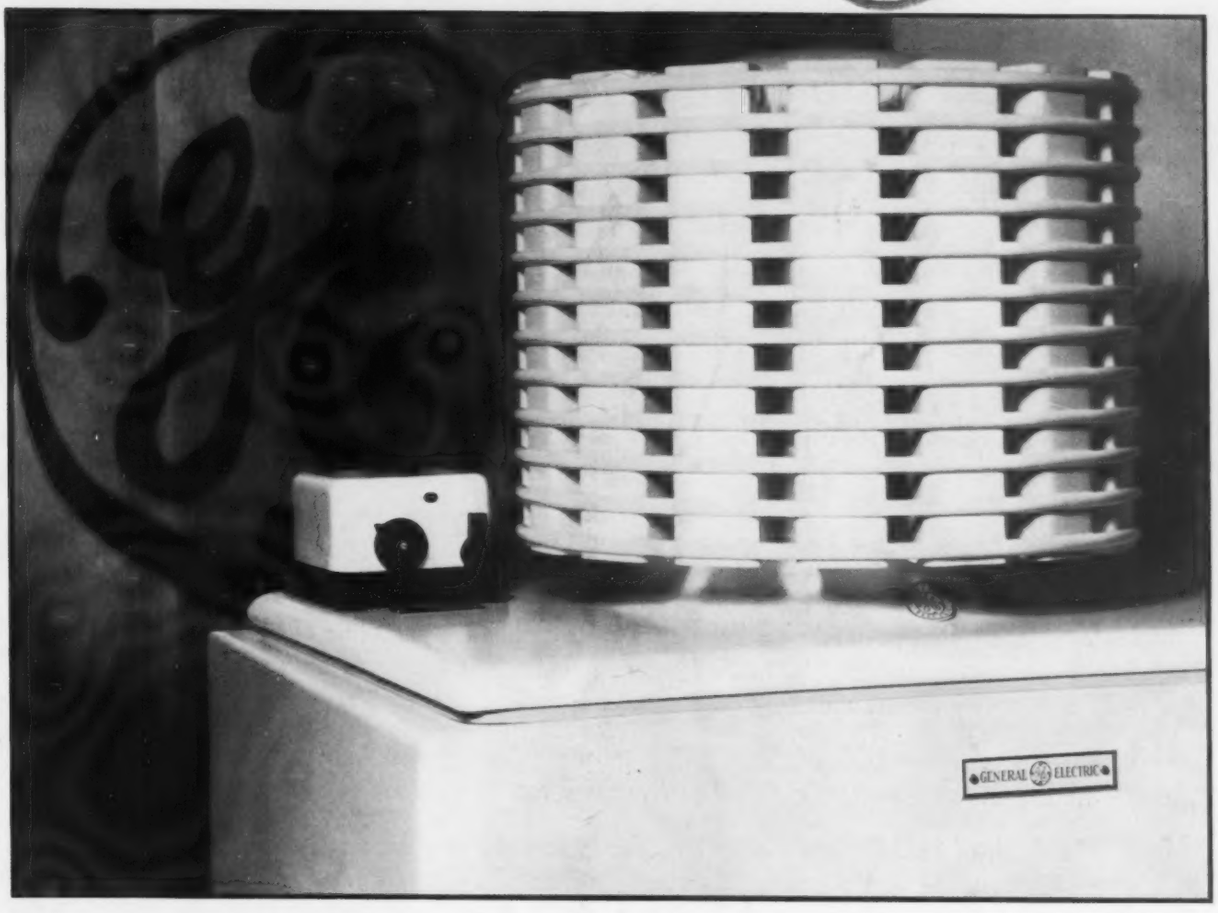

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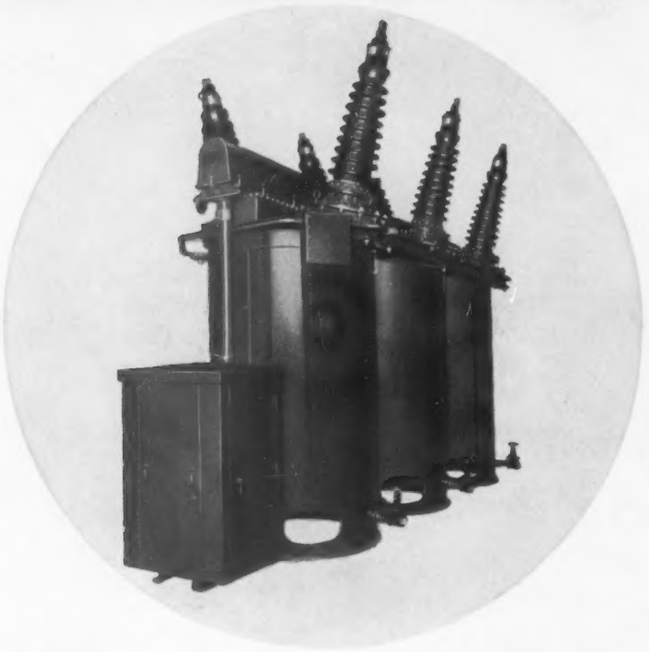

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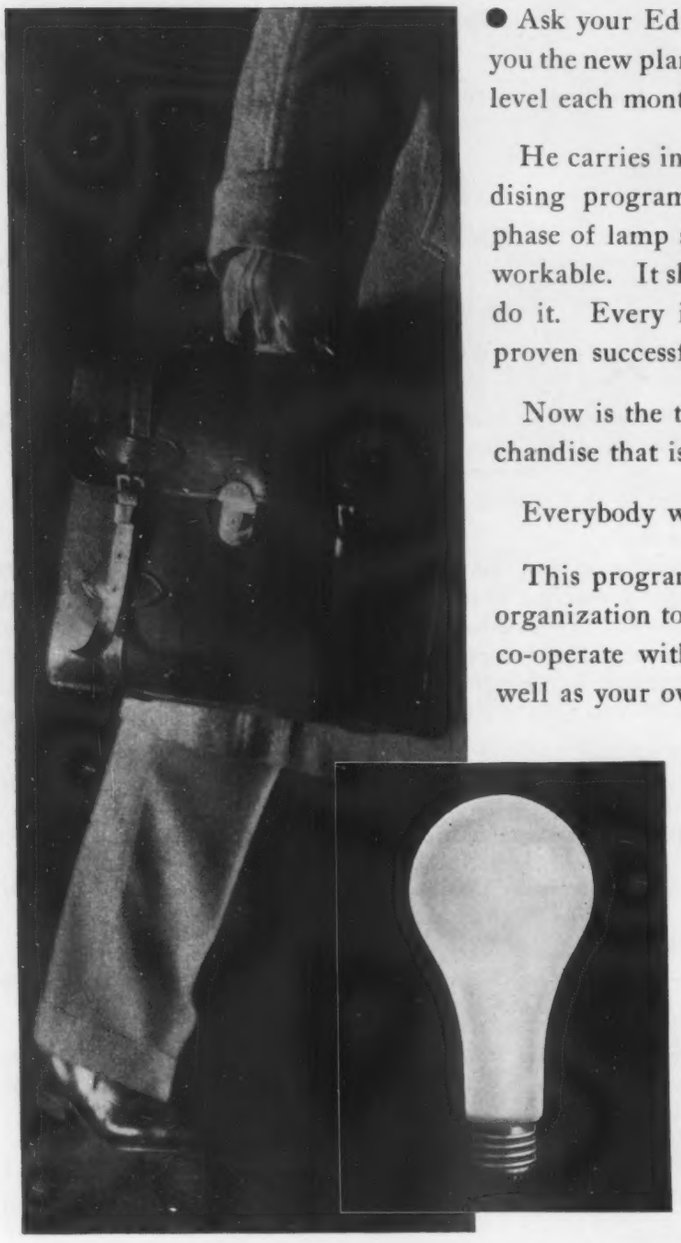
He Carries the KEY *to Sustained Sales*



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With which is consolidated the Journal of Electricity

McGraw-Hill Company of California

San Francisco, April 1, 1932

Volume 68

Number 4

G. C. TENNEY, *Editor*

SEATTLE'S victorious mayoralty condidate, John F. Dore, promises to slash salaries, including his own, proposes high-handed methods with regard to the city's street railway, will support City Light. Voters abolished the office of superintendent of utilities.

▼

SOUTHERN California Edison adopted, on March 26, a new off-peak water heating rate with a penny a kilowatt-hour base, directs its three months' campaign at 25,000 range users who haven't water heaters.

▼

DEPRESSION-SPRUNG into its new importance, air conditioning may be the new bonanza of load-building and equipment sales. A superficial knowledge of what it is, what it does and its local possibilities may be of use. (See p. 168.)

▼

REGISTRAR C. W. Huntington makes a semi-annual report on California's contractors' law, proving that statutes are still being enforced—and obeyed. (See p. 170.)

▼

ONE after another, outstanding lighting jobs have been conceived and born in the West. Now comes the latest word—Oakland's Paramount Theater—as the result of architect plus engineer plus cooperation. (See p. 172.)

▼

COURAGEOUS was the Rocky Mountain campaign, "Give Something Electrical for Christmas." So successful was the holiday drive that others are planned or running this spring. (See p. 182.)

The Month

PARSIMONIOUS customers will be cured and converted, visions each of the dealers, salesmen and employees in P. G. and E. territory, after hearing and seeing the dramatized story of the company's commercial program and cooperative plans for 1932. This is the second year of the barnstorming tour. (See p. 180.)

▼

"BIGGEST in the world" is an old phrase on the Pacific Coast, but the b.i.t.w. hydrogen-cooled synchronous condenser is the newest addition to the Edison company's list. And, progressively, it was made so not for the honor, but for the economic advantages of size and type. (See p. 191.)

▼

POSTPONED indefinitely is the voting on Los Angeles' $34,400,000 bond issue for a steam plant at Wilmington and a transmission line to Hoover Dam; the election was originally scheduled for May. Reason given: Not enough time to ballyhoo the steam plant, etc; danger of defeat.

▼

THE Pacific Coast Electrical Bureau—ELECTRICAL WEST name contest for electric heat has been a boon to the Postoffice Department. (Don't send a boy for the mail today, send a truck.)

Editorial

Returning to Personal Values

PRODUCT of a mechanistic age that it was, it was natural that business during the past few years should ignore or forget personal values. Its human side was relegated to the folder marked "Future Reference." The world was too busy perfecting the machinery of production—the transmission lines of distribution—and erecting marketing structures to be bothered with human beings. As long as they were well fed and paid they could adjust themselves somehow.

Recession of business, the inability of mechanism alone to keep the economic order in motion, has thrown the load back upon the shoulders of human beings. Their ability or failure to carry it becomes a serious affair. What is worse, most of the maladjustments, all of the irritations and causes for friction are personal.

The merchandising problem has become acute because, in the rush of affairs, the human relationships between central station men and dealers were neglected. Association functions break down because too many people expect them to run smoothly and solve all their problems nationally, instead of attempting to adjust them right in the back yard at home. Salesmen lose orders through their neglect of the personal follow-up, the intimate servicing of the account, because they have come to expect the "head office" to take care of that.

In every ramification of business experience the human, the personal, the intimate relationships are returning. If the crisis has no other benefit than to show that mechanism does not run by itself alone, that organization only functions when human beings are anxious and earnest in wanting to make it function, then its cost in human distress will have been repaid.

"We Did, We Can, We Will!"

HOW to make every employee a salesman is a question that many commercial managers are trying to answer in these days of decreasing kilowatt-hour sales and fading gross revenues. Every sales department program contains plans to enlist all utility employees in the sales army. Few light and power companies have been successful in this respect. Apathy of the employees themselves, the feeling that the job could not be done, lack of enthusiasm, or failure of the commercial department to supervise and direct the program properly have contributed to this lack of success.

But from other utility fields comes proof that employees can be taught to sell and their support enlisted. Some of the records made should elicit a shameful blush from light and power company commercial executives.

The campaign of The Pullman Company to sell purchasers of lower berths a complete section is a fair example. One cannot board a train for an overnight ride without a courteous suggestion from Pullman conductor or porter that the complete section, with additional comfort and convenience, may be had for a slight additional charge.

However, the record of The Pacific Telephone and Telegraph Company is the most outstanding of all. Between Aug. 10 and Dec. 20 of last year 80,053 new stations were sold by telephone employees. Average individual sales per month tripled, increasing from 0.205 per emloyee per month to 0.61. Suppose that this ratio held for power company employees in securing 1 kw. of new load per month, or selling one new appliance per month. The net effect on load and revenue would counteract losses that are not now being offset.

The campaign of the Telephone Company to encourage employee sales effort is worthy of study. Many power companies might adopt the sales slogan of their sister utility—"We did, we can, we will!"

Modern Service and Rates

FORESIGHTED engineers are beginning to wonder to what ultimate destination the modern practice of deifying service is leading the public utilities. Born of the desire to render greater convenience to customers and thereby improve public relations, the standards of service have been raised to levels but one degree removed from perfection. After experiencing this high type of service over a period of time, customers now do not feel that it is unreasonable to demand 100 per cent continuity. Contributing to this are electric clocks, radios and a general use of many other appliances which have become the essentials of modern life and have increased the necessity for adequate electrical service.

System design and operating engineers have been able to maintain these high standards of service and at the same time provide for a continuous reduction in the price of energy to the consumer. It is physically possible to provide lines and equipment which will eliminate the present fractional per cent

outages and maintain 100 per cent continuity of service to all classes of customers. To what extent this is practical from an economic consideration or necessary from the public relations viewpoint is a question of particular importance in these times of reduced expenditures and rate investigations.

If it is logical or necessary to maintain perfect service, it is also logical that this factor be evaluated with rates commensurate with the additional investment necessary to supply it. Future rate structures may take cognizance of this situation and include frequency and duration of outage as a factor in their compilation. It is just and equitable that customers whose requirements demand particularly exacting service should bear a proportion of the burden thus imposed on the utilities.

Business and Industry's Interest in Government's Budget-Balancing

GOVERNMENT, taking its cue from business, has finally awakened to the fact that budgets must be balanced if there is to be stability and security. Like business, government has suddenly discovered that expenses are far in excess of income. Unlike business, government has a simple remedy—increased taxes or increased borrowings.

Business knows that government is costing too much, that it is extravagant, wasteful, and, unfortunately, is even becoming eleemosynary. No amount of argument on the part of industry and business will stop the inevitable tax increases and public borrowings in the present emergenecy. Transactions, products or services now free from federal levies are going to be forced to shoulder a larger tax burden. The question is simply when and where.

Among the proposals submitted is that of a general tax on electrical energy, one proposition calling for an impost of one-half cent a kilowatt-hour and another for a flat tax of five per cent on the gross billings to the consumers. The first is ridiculous; the second would place a burden directly upon industry, commerce and agriculture, which, like the last straw, would break some backs. Uniquely, every industry has expressed the same sentiments regarding tax proposals aimed at its particular field. Here is cause for legislators to pause and consider.

Expenditures by all classes of government have run wild during the last decade. Such spendthrift profligacy has never before been witnessed, and unfortunately its consequences are not realized. Nor is the end in sight. Granted that relief must be accorded the unfortunate millions of jobless, then let this relief be in the form of supplies to the needy, not money doles or the promise of work from governmental projects which of themselves will place only twenty or thirty per cent of the actual cash expended in the hands of labor.

Business and industry must face the fact that government is in dire distress, that in looking for a way out it may encroach upon the responsibilities of private initiative, that it surely will increase taxes and borrowings this year and the next and the next. It is up to business and industry to call a halt.

Active Load Development A Necessary Company Function

AMIDST a certain amount of executive indecision on the question, to merchandise or not to merchandise, the statement of Guy W. Talbot, president of the Pacific Power & Light Company, anent the active load development program of that company for 1932, announced in the February ELECTRICAL WEST (p. 92), strikes a sharp, clear-cut note. Around such a standard bearer those who still believe that if you want a thing done you must not leave it wholly to others may rally with strengthened conviction. In a few terse phrases Mr. Talbott places the commercial department on the same level of importance as the operating, engineering, and accounting departments, and in the next breath utters the strongest statement on the subject ELECTRICAL WEST has noted from any chief executive:

"That company which makes no effort to secure additional business will eventually lose that which it now has."

Further, Mr. Talbot recognizes that if other dealers in electrical goods make themselves partners of the company in the development enterprise, they too may profit and the company's effort to build load will be augmented. He urges the company to take the initiative in forming this partnership.

Translating this bit of business philosophy into a working plan, V. H. Moon, sales manager, has set up a program that meets most trade objections. The important points are that the company is going out aggressively after new business rather than taking a chance on losing that which it has by leaving the job for George to do; and that, recognizing the eminent justice and business wisdom in getting George's aid, it is seeking this aid by emphasizing load rather than dollars and cents in merchandise sales and by compensating its salesmen accordingly.

Air Conditioning —Where Does It Fit?

What is air conditioning? What should it do? What types of units are there? How do they operate? Where can they be sold?

WHENEVER air-conditioning is mentioned, newly-popular subject that it is, some brave soul is prompted to ask one or all of the above questions. The answers, if any, are as numerous as can be, for, while not in itself new, air-conditioning in its present promotional stage is an outgrowth of the depression and the search for new load possibilities. The misconceptions usually are prompted by the picture of air being sent through a dry-bath of carbon, emerging sweet and pure, or of the current theater-type of air treatment, consisting of forcing large quantities of air over even larger cakes of ice, so that the signs, "70 degrees cooler inside" will have some background.

But that is not true air-conditioning. The term is defined as "the art of producing certain atmospheric conditions indoors," but because it encompasses three factors—temperature, humidity and air movement—it is more inclusive than any one. Greater, that is, than merely the cooling or heating of air, or its humidifying or dehumidifying.

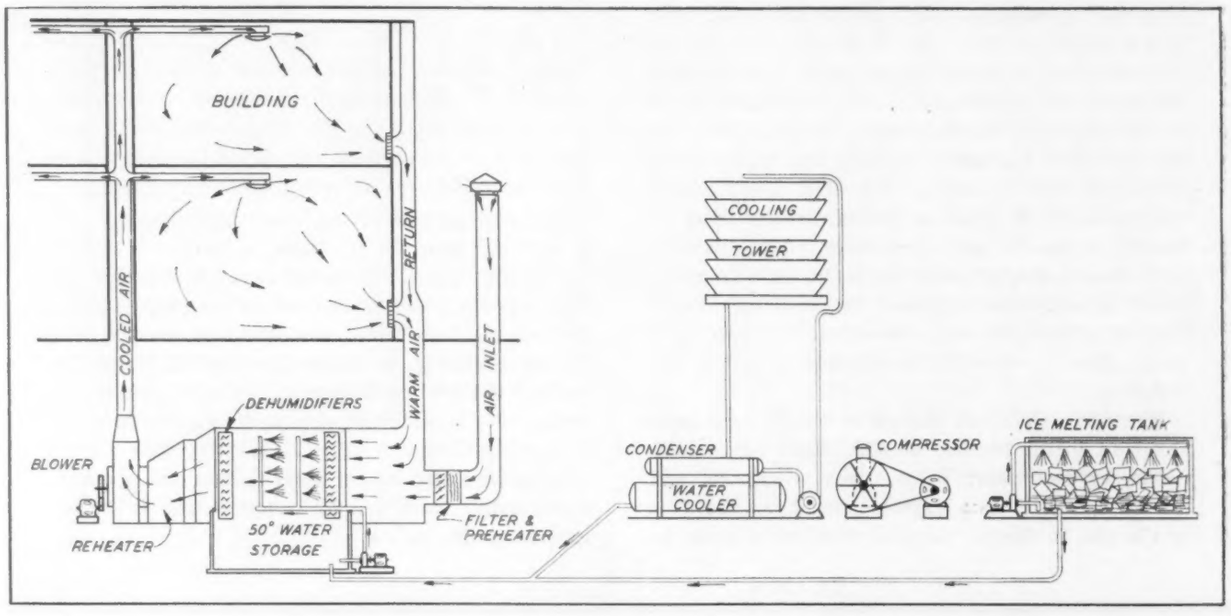
Air-conditioning systems, to be complete, should:

1. Remove dust and dirt from air entering the building.
2. Cool the air in summer.
3. Warm the air in winter.
4. Increase or decrease the moisture content (relative humidity) of the air.
5. Ionize or ozonate the air.
6. Circulate the air evenly throughout the building at all times.

There are, however, localities where a complete system is not necessary and a partial system will answer the purpose, depending upon the customer's requirements and climatic conditions. For instance, in most Pacific Coast districts the relative humidity, in general, is lower than it is throughout the East and Middle West, so that with comparable summer temperatures residents of the Pacific states are far and away more comfortable than residents of the other sections. Thus, as air-conditioning is nothing but an artificial means of providing comfortable indoor conditions, humidifying equipment often may be excluded from an installation.

Various investigating bodies have determined that certain combinations of the three factors mentioned (temperature, humidity and air movement) produce equal sensations of warmth or cold. Temperatures in two different rooms may be many degrees apart, but because the humidity and air movements have been regulated accordingly, the physiologic effect on the body will be the same. The index of these equivalent conditions is called the *effective temperature.*

Elementary, the diagram shows the many functioning units which comprise a complete air conditioning system and shows the path of the refrigerant (water) to the conditioning unit and the air into and through the building. No elaborate or particular system is this, but it does show the different parts in plausible sequence



In actual practice an attempt is made to keep the effective temperature of the inside comparable to the effective temperature of the outside. To this end many tables have been prepared showing the various bulb thermometer temperatures and the indoor conditions to be maintained. At first thought it would appear advisable to cool a room to, say, 70 deg. F. when the outside temperature is around 95 deg. or 100 deg. F. In practice, this is neither desirable nor economical. For an outside temperature of 95 deg. F., the bulb temperature inside should be approximately 80 deg. F. and an effective temperature of 73.4 maintained.

How a System Operates

It is not possible here to delve deeply into the operation and component parts of an air-conditioning system; briefly, the operation is this:

Outside air is delivered through ducts by means of a fan to the air filters and then to the conditioning apparatus, where the air comes in contact with a dense water mist. The temperature of the water is controlled automatically by either heat or cooling; this also controls the moisture content (humidity) of the air. In addition to moistening, the water spray removes from the air the soluble matter and coarse dust particles. The saturated air then passes over a series of eliminators or baffle plates which trap the excess water particles and more of the dust. As the air leaves the spray chamber it comes in contact with heating coils which raise its temperature to the desired degree. From this point conditioned air is delivered uniformly through ducts to all parts of the building. During summer, instead of heating and humidifying the air, the system cools and dehumidifies it. Cold water is supplied from an ice chamber or a refrigeration unit.

Two types of fans are used: a propeller type where ducts are short or there are no ducts, and a centrifugal or turbine type where air resistance is high because of long ducts. There are also two types of air filters: the dry type, composed of coated aluminum plates, perforated for air passage in small streams, or of metal frames in which are placed sheets of gauzy cellulose tissue; and the wet, or viscous, type, composed of viscous-coated metal baffles or crimped wire, or a series of screens, or numerous sinuous passages. The wet type filters are either manually cleaned (by removal) or self cleaned by a continuous bath of oil which dissolves the dust.

Of the air conditioners there are three general types. The air washer type, most generally used in large central installations, is necessary where close regulation of the humidity is desired. The spray type unit provides, in a single unit, a complete assembly of means for washing, humidifying, dehumidifying, heating and cooling the air. This is especially adaptable to small, individual installations in single rooms or offices and is the basis for the small unit now being manufactured by many companies. The third type is the coil air conditioner, which passes air against and through coils filled with refrigerant. Obviously, it cannot closely regulate humidity, although it effectively does so with comparatively high or low refrigerant temperatures.

Commercial Possibilities

Enough for the system itself. Important to many is the answer to the question, "Where can it be sold?" Perhaps the West is not so fertile a market as the East, but central station men should vizualize say 20 per cent of their domestic customers using air conditioning with a 1½- to 5-hp. load operating ten hours daily and practically every day in the year. Present commercial installations in hotels, restaurants, offices, theaters and manufacturing establishments range from 25 to 1,000 hp., and there are many installations that use many thousands of horsepower, operating from 10 to 24 hours daily 300 to 365 days annually. Is this a negligible market?

The market for air conditioning is too large to be covered completely here, but the air conditioning committee of the Pacific Coast Electrical Assn. has compiled a list showing 115 applications in which systems are already installed, and new applications develop rapidly. Look at this list:

1. Applications for producing human comfort—
   - Theaters
   - Restaurants
   - Department stores
   - Hotels
   - Residences
   - Trains, etc.
2. Industrial low temperature drying and general dehumidification—
   - Glue plants
   - Match plants
   - Sausage curing plants
   - Fur curing plants, etc.
3. Industrial processes—
   - Bakeries
   - Bulb storages
   - Candy factories and shops
   - Cigar factories
   - Paint establishments
4. Cooling and preservation of foods—
   - Cold storage rooms
   - Packing plants
   - Shipholds for fruits, meats, vegetables
5. General cooling and refrigeration—
   - Fur storages
   - Milk storages
   - Ice cream plants
   - Soap factories
6. Laboratories—
   - Engine testing laboratories
   - General laboratories

Even in that list there are possibilities to keep power salesmen busy selling the idea so that manufacturers' agents can sell the system.

More Specific Leads

Almost any process would be better with air conditioning. The food industry in the West is especially adaptable to air government, and the multitude of processes which make up the canning, curing, storage, packing and preservation of foods each offers a field for sales work.

In beauty shops, specialty shops, directors' rooms, dentists' offices (who hasn't suffered during a summer afternoon in a dentist's chair?), bank vaults, organ lofts and even yachts, an air conditioning system has a place.

Homes occupied seasonally offer a fine field, for valuable furniture and expensive tapestries can be ruined by a season's neglect. Most basements in residences could be used the year round for storage or living, if it were not for the dampness and cold. Why not an air conditioner to remedy this? Libraries, either private or public, suffer a tremendous toll from high humidity, for moisture will make book bindings limp and wavy. In the case of rare volumes and first editions, this loss is irreparable. Clothes closets must be watched carefully to prevent mildewing. Why not eliminate that? In the den, where studying and reading are done by son and father, high or low temperatures and unregulated humidity cause discomfort and hinder concentration. Investigators have proved that a human being can do four times as much work in a temperature of 100 deg. F. when the relative humidity is 30 per cent than when it is 100 per cent. Discomfort, causing lack of concentration, probably is to blame for as many school failures as lack of study.

Consulting engineers, ventilating equipment manufacturers, fan and motor manufacturers, refrigerator and ice manufacturers, time switch and accessory equipment manufacturers and power companies all have a great deal to gain by selling air conditioning.

Does California's Law Help the Contractor?

HOW is California's contractors' law working? Has it accomplished what has been expected of it? How is it being administered? These and many similar questions are being asked, not only within that state, but by other states themselves anxious to do something that will stabilize and regulate many of the evils resulting from the contracting form of doing business.

Actual experience with the California contractors' law in the past two years well bears out the report recently issued by Carlos W. Huntington, director and registrar of contractors for the state of California. It is the semi-annual report for the period ended Dec. 31, 1931, and reviews the various activities of the Department of Professional and Vocational Standards of the Contractors' Registration Division for that period.

Although the law is not necessarily one solely for the policing of the contracting industry, interest attaches particularly to this phase of the work.

According to Section 9 of the Act itself, the registrar of contractors may now upon his own motion investigate the actions of any contractor in the state and is given power temporarily to suspend or permanently revoke a license issued under the provisions of the Act if a licensee is guilty of or commits any one or more of the following acts or omissions:

1. Abandonment of any contract without legal excuse.
2. Diversion of funds or property received for prosecution or completion of a specific contract, or for a specified purpose in the prosecution or completion of any contract, and their application or use for any other contract, obligation or purpose.
3. Fraudulent departure from or disregard of plans or specifications in any material respect, without consent of the owner or his duly authorized representative.
4. Willful and deliberate disregard and violation of the building code of the state, or of any political subdivision thereof, or of the safety laws or labor laws of the state.
5. Failure to keep records showing all receipts and disbursements of the licensee in all of his transactions as a contractor as that term is defined in this Act.
6. Misrepresentation of a material fact by applicant in obtaining a license.
7. The doing of any willful, fraudulent act by the licensee as a contractor in consequence of which another is substantially injured.

In the report of Mr. Huntington, the following statement is made.

Arrests—Misdemeanor Complaints

"The policy of the registrar as to arrest of unlicensed operators does not include wholesale arrests with no consideration of the circumstances. Inspectors discovering cases that appear to warrant arrest, except in special circumstances, secure instructions from their immediate superiors before proceeding to secure a warrant. Any indication that the contractor is attempting to willfully evade registration, however, results in orders for his prosecution. Furthermore, discovery of facts indicating that contractor has also attempted to evade his other contractual responsibilities and has violated the provisions of the license law pertaining to suspension or revocation of licenses, automatically denies him any leniency from the department in so far as his prosecution for contracting without a license is concerned. There was an increase in arrests during the six-month period ending December 31, 1931, over the corresponding month in 1930, and the number will probably increase slightly in the similar period upon which we are just embarking. That all arrests were justified is amply proved by the resultant number of convictions. In most cases the offender received, over and above any fines assessed, a suspended judgment based on future compliance with the state laws and good conduct in his contracting operations.

Complaints and Their Results

"Herewith a tabulated report of the operations of the complaint section for the first half of the fiscal year:

Complaints filed or pending from June, 1931	359
Complaints pending action Dec. 31, 1931	98
Complaints settled or dismissed prior to hearing	82
Hearings held:	
Cases settled	107
Cases dismissed	40
Cases continued	25
Amounts involved in cases closed or dismissed	$216,886.73
Amounts involved in pending cases	219,450.57
Informal complaints investigated and settled	31
Amounts involved (approximately)	$7,400.00
Licenses suspended	25
Licenses revoked	4
Licenses reinstated	8
Applicants denied licenses	7
Prosecutions completed	11
Prosecutions dismissed upon compliance	3
Prosecutions pending	5
Convictions secured	8

"Nearly 500 former contractors, either because of actual suspension or revocation of their licenses, or of the license of the firm with which they were connected in a responsible capacity, or because of charges filed but unsettled, are barred from securing a license. In cases where a suspension has been made, the license may be reinstated upon satisfaction of the complaint at the approval of the registrar. Where a license has been revoked, the registrar may issue another at his discretion only after a year has elapsed and after the charges proved in the complaint have been settled. Many former contractors, however, against whom charges are pending, have dropped out of business or were not licensed at the time of the offense and have not continued in business. In such cases a license is refused when application is made and the applicant must appear at a hearing with evidence supporting his reputation and integrity as a contractor as attacked by the complaint on file.

"The best concrete evidence of the success of the Contractors' Registration Act is shown in the work of the complaint section. Letters from building officials, from trade organizations, from other associations, firms and individuals, expressing satisfaction with the work done by the department, are but intangible opinions, but the foregoing report actually shows the value of the law, not completely, but in respect to the work of the complaint section. These complaints filed on charges too numerous to list involve damages to owners, to businesses, and to other contractors. They involve violations of state laws protecting the safety of employees, and providing against loss to their families in case of injury or death. They involve cases of theft of wages. Municipal building law violators are brought to the registrar for disciplinary action. Those financing building operations have often applied for assistance in protecting their

funds and their security. Other complaints charging purely fraudulent actions have been filed with no damage claims involved, but for the purpose of protecting the public at large.

"It would be interesting indeed to know how many cases have arisen where contractors have altered their acts or their entire business methods rather than risk loss of their licenses. It is only reasonable to suppose that the chief value of any act, such as the Contractors' Registration Law, lies in its effect in stopping the depredations of the unscrupulous operator before he has brought grief to someone. It is assumed there can be no question that such an influence is being exerted by the law. Definite ways to measure these benefits of course are lacking. However, to a small degree this tendency is shown in the fact that the number of complaints filed with the registrar has decreased as compared with the similar period in 1930. This decrease is very significant, as it is generally conceded that not for many years have the inducements been so great for a contractor to slight his work or take an illegitimate profit or abandon an unprofitable job or divert funds or property. With the construction business in its present chaotic state, due to trade abuses, which have reached such an alarming proportion in the last few years, as well as to general business conditions, with contract prices as absurdly low as they are, with competition as keen as it is, and with as many contractors with their backs against the financial wall as we know to be the case, still complaint cases have dropped. This decrease in part has been due to a lessening of attempts to make the department a collection agency, in which light its functions were mistakenly seen by many in the past, but a close examination shows that complaints based on proper grounds have lightened by about 10 per cent. Furthermore, the percentage of complaints settled prior to a hearing indicates the effect upon a contractor who finds his actions are about to be brought to light before the registrar.

Suspension and Revocation of Licenses

"The small number of suspensions and revocations is a strong index of the value of the contractors' law. This figure should be compared with the number of complaints filed and the number of cases settled at hearings. It proves without a doubt that success in a large measure follows an action against a contractor when the complaint is justly based, and it proves the otherwise recalcitrant contractor is taking no chances on a decision against him, but is voluntarily settling the matter or is immediately carrying out the orders of the department. The good moral effect of a case settled without a suspension or revocation is often minimized. Under such circumstances, because the department has not 'shown its teeth,' it does not follow no lesson has been learned by the contractor, for 'second offenders' before the registrar are very seldom recorded. Naturally, when such a contractor is again in trouble, he will be dealt with more severely and is usually not allowed merely to settle the complaint, but is also given a suspension or a revocation. The department maintains that the above figures, carefully analyzed, show that the contractor who has been brought before the registrar or an examiner goes forth, if his license is not taken from him, a safer man for the public to deal with and a better competitor of the conscientious contractors.

"Through the increased fee it is now possible to conduct all hearings and proceedings in the locality where the trouble arises, saving to the public concerned and the contractors involved the costs of long trips to the offices of the registrar. This also allows the attendance of witnesses who might otherwise be unavailable."

As first written, the contractors' license law controlled only contracts for work over $200 in amount. The law was amended in 1931 to define more clearly this provision of the Act which now reads as follows:

"Any work or operation on one undertaking or project by contract or contracts performed directly or indirectly by one contractor, and the aggregate contract price for which, for labor, materials, and all other items, is less than $200, such work or operations being considered as of casual, minor, or inconsequential nature; provided, however, that the limitations of this section shall not apply in any case wherein the work of construction is only a part of a larger or major operation, or in which a division of the operation is made in contracts of amounts less than $200 for the purpose of evasion of this Act, or otherwise; and provided further that the provisions of this section shall not apply to any work or operation connected with the sale or installation of any finished product, material, or article of merchandise, which is not fabricated into and does not become a permanent fixed part of the structure."

By this provision only inconsequential or repair work can evade the necessity for a contractor being licensed.

This has been followed very closely and a notable improvement has been made in the enforcement of the Act because of it.

Already in the state of New York similar legislation, modeled on the California law, is in process of being drafted to submit to the Legislature. Requests have come from other states also for information relative to the Act and its enforcement. The year 1931 was a severe test for the operation of such an Act because of the competitive conditions induced by the generally low state of the building construction industry. That it has protected the public and reliable contracting firms has been demonstrated very well during its second year of operation.

▼

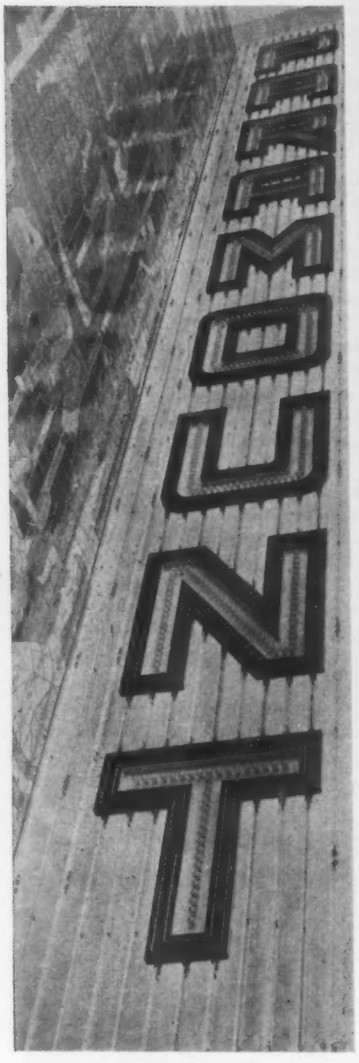
Proper Lighting Builds Window Value

"PROPER lighting is a fundamental requirement for a good window," declared R. P. Connally, vice-president and general manager of The Emporium, San Francisco department store, at the thirtieth semi-annual meeting of The Furniture Exchange. "Many windows," he went on, "would be worth many times their present rental value if they were properly lighted. Many windows are expensive to maintain and contain expensive merchandise, but they are of little value to the stores because of the poor or improper lighting."

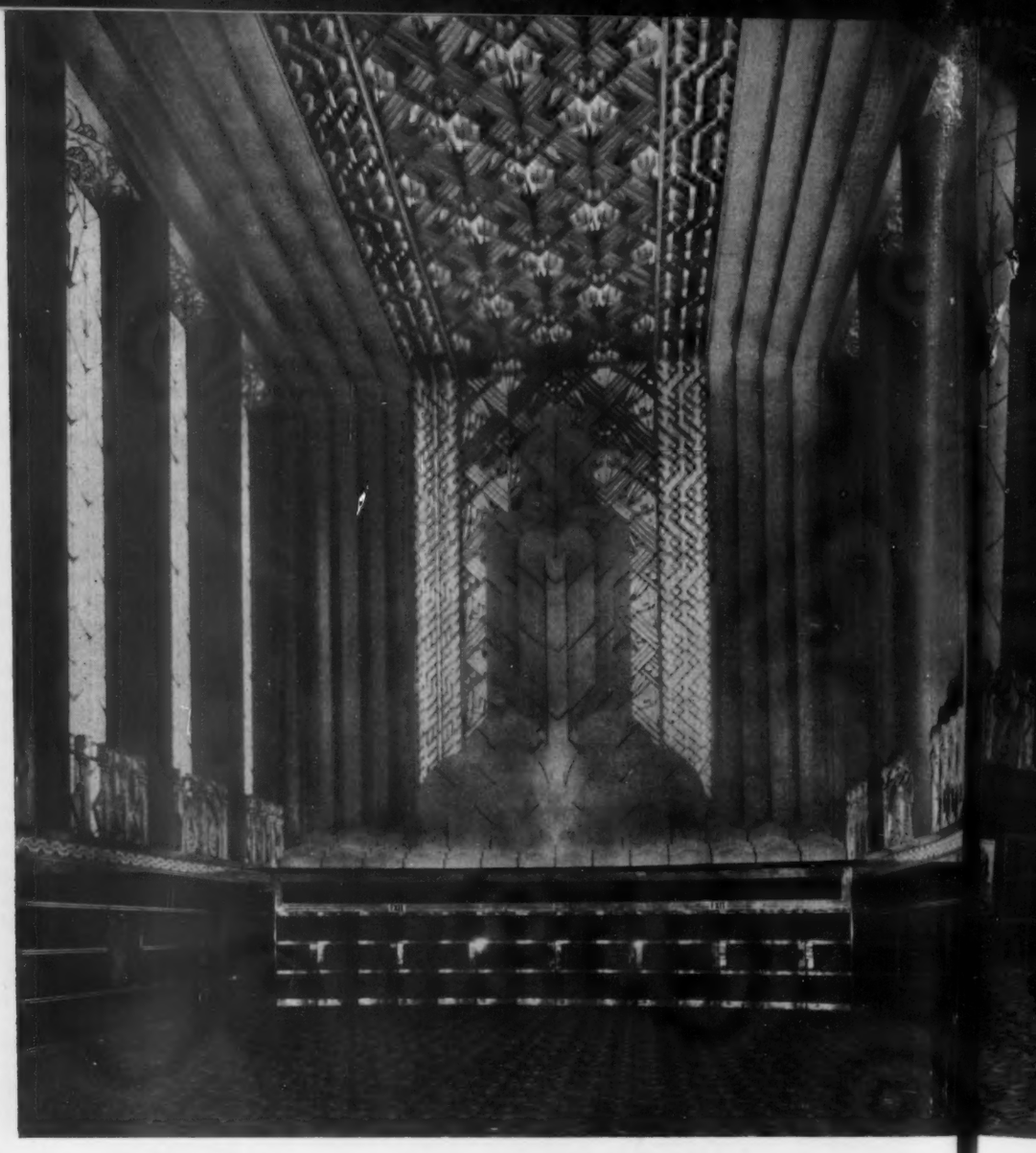
He deprecated the unfair use of light to make merchandise look better or different as a serious breach of the ethics of window displaying.

As an example of the correct method of illuminating a furniture window, a model was erected. The furniture and drapes were loaned by The Emporium and the reflectors used were the property of the Wuelker Reflector-Lighting Corporation.

The



Faced with polished stainless steel, each side of this 120-ft. sign is lined with fifteen vertical bars of neon tubing, alternating green and blue. Each 6 x 7-ft. letter is outlined in neon, contains 553 40-watt lamps. Neon and incandescent letters flash alternately



Theater in Oakland

By G. M. SIMONSON
Consulting Electrical Engineer, San Francisco

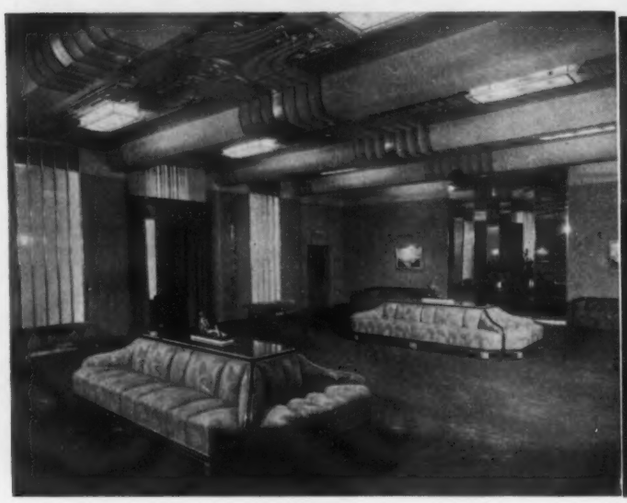
ANOTHER of the modern architectural conceptions of J. R. Miller and T. L. Pflueger, designers of Bal Tabarin, the San Francisco Stock Exchange and other original edifices, again daringly employing light and metal in simple, sweeping masses, is the new Paramount Theater, recently opened in Oakland and described in pictures in these pages. Its startling color combinations begin with the exterior tile facing and ponderous steel and neon sign supported by a marquee whose 2,860 15-watt lamps blaze the sidewalk. These effects extend into the theater through its high-roofed lobby, whose metal-finned sky is peacock green in contrast to the tall amber windows, red gold columns and black marble and steel side walls. The coloring carries through corridors of simple richness to the auditorium, similarly skyed and equally striking in its mass effect. Electricity, the means by which it is lighted and its effects manipulated, is an exceedingly important functioning part of the theater. It is impossible to detail all of its applications or describe the variations of effects produced by it.

The installation was made by Radelfinger Bros., with Sam Radelfinger personally superintending the work. The unusual lighting fixtures are the work of Roberts Manufacturing Co. and Maxwell Hardware Co. Switchboards and lighting equipments are Major, and the intricate flashing system and neon sign and marquee outlining, for which there are 10,000 ft. of tubing, was worked out by the Electrical Products Corp. The construction of the theater was supervised by Nathan Light, engineer for the Paramount Co. This theater initiated the underground network system in the city of Oakland. It has a connected power load of 450 hp. and a connected lighting load of 800 kw.

Main Lobby

To the left and on the facing page are pictures of the spacious main lobby, 42 ft. wide, 65 ft. long and 52 ft. high. The 25-ft. center ceiling and end walls are of 12-in. vertical galvanized iron fins spaced 4 to 6 in. apart in a lace-like pattern. This fin work is supported by steel rods run through the plastered ceiling of the light chamber to furring channels. Illumination is from border light strips with 200-watt chromium reflectors equipped with special green rondels on 2-ft. centers. Tips of hanging fins over the stairway are provided with light deflectors and 25-watt green lamps. Acid-etched plate glass with sand-blasted designs forms the light fountain seen just over the entrance doors. Panels are set on angle-iron frames, the tallest rising 40 ft. Amber lamps, placed between panels to throw light at a sharp angle, bring out the designs. Between the columns on each side of the lobby are 6 x 35-ft. windows of acid-etched sheet glass, behind which are light chambers 12 in. deep. Vertical light troughs with 40-watt inside amber lamps on 12-in. centers are placed in the false columns, with a ladder in the center of each column for relamping. The type of lighting in this lobby does not allow for utilization of a few outlets for emergency lighting. A double-pole relay with two poles normally opened and two poles normally closed is provided to act as a transfer to energize four 500-watt lamps in steel reflectors set flush with the plastered ceiling over the fin work. The relay coil is energized from the general lighting source and the lower contacts from the emergency source. Failure of the general source automatically connects the four lamps to the emergency circuit through the relay

Below—Ten fixtures, made of large sheets of acid-etched glass hung from the ceiling with lamps recessed, light the public lounge in the basement. There are also four light boxes with glass panels separated into vertical panels with extruded aluminum mullions. These are illuminated by lamps set back 12 in. from panel sides on 12 in. centers

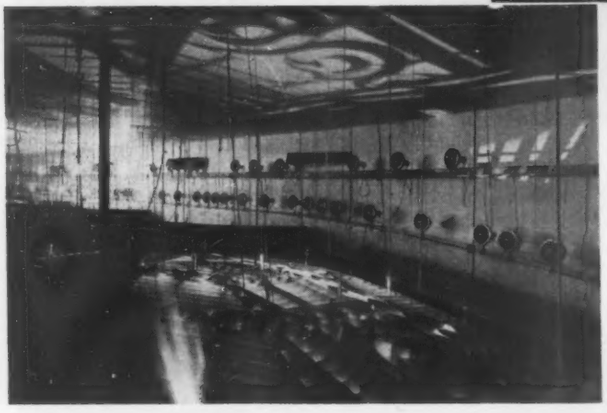


Below—Foyers are illuminated by several types of fixtures. Ceiling fixtures are made of sand-blasted glass panels set horizontal or in panels. In the mezzanine and orchestra foyers, table and floor lamps are numerous, lending a touch of casualness. Off the mezzanine foyer is another lounge with adjacent men's smoking and ladies' cosmetic rooms

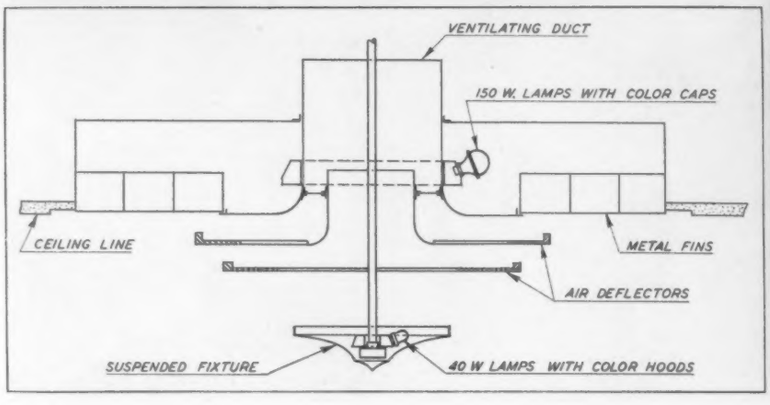
Interior

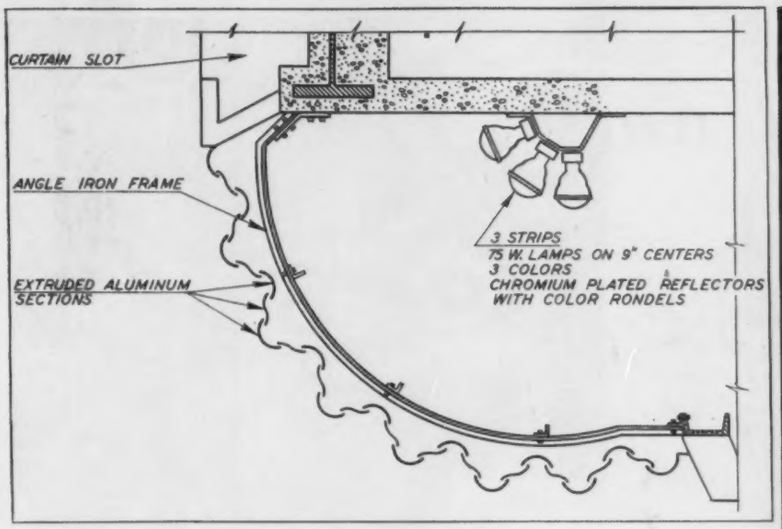
Similar to that in the main lobby, the theater ceiling is composed of fins, in an area 62 x 120 ft. The fins are arranged in six panels, each about 1 ft. below the next and following the curve of the ceiling from front to back. The house lighting consists of three colors: red, amber and blue, all on dimmers. There are twelve ceiling fixtures, six on each side of the fin area; fourteen side-wall brackets of perforated sheet metal which throw indirect light on the walls; and twelve circular recessed fin fixtures in the balcony soffit. Ceiling fixtures are made in the form of three inverted cones, throwing indirect light on the ceiling. In each fixture are 24 amber, 24 red and 30 blue 40-watt inside colored lamps. The central body is provided for the sockets and wiring, and slides on a fixed pipe into the attic space for access to lamps. Six of the fixtures are connected to air supply ducts and the concentric cones act as diffusing waves. Recessed in the balcony rail are 40 spots with 1,000-watt lamps. Twenty-four are arranged in groups of eight on the three colors and are equipped with spread lenses and color holders for stage work, being controlled from the stage pilot board. Others, with special colors, are used for lighting organ screens; some are special spotlights. Emergency light consists of 500-watt lamps, four in the main ceiling and two in the balcony soffit, all on a transfer switch

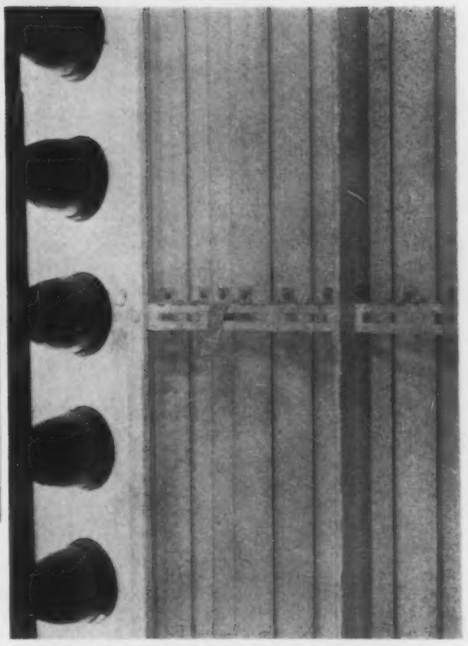
Below—In the light chamber are 144 floodlights with 500-watt lamps and diffusing color lenses, 48 units on each of the three colors. Units are clamped to a continuous pipe railing, and are wired with No. 14 heater cord to wiring troughs with three units per circuit. Above the floodlights may be seen ventilating ducts for incoming air, diffused through the open ceiling



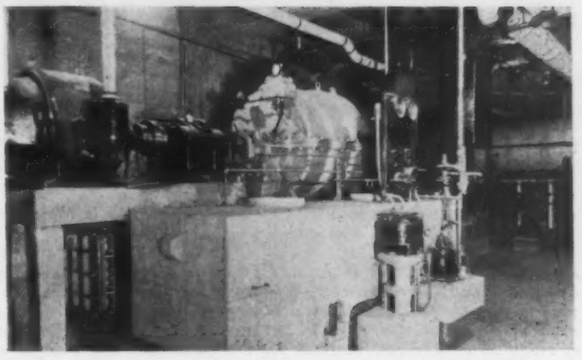
Below—Four of the twelve soffit fixtures are 10 ft. in diameter; the others are 8 ft. Details of the construction may be seen in the picture of the larger fixture, lowered on its winch, and from the drawing. All of these fixtures have central ventilating supply ducts and diffusing plates. Each is equipped with eight lamps (150-watt for the larger, 100-watt for the smaller) with color hoods, wired through a circular trough around the supply duct. The centers are lowered by winches for relamping





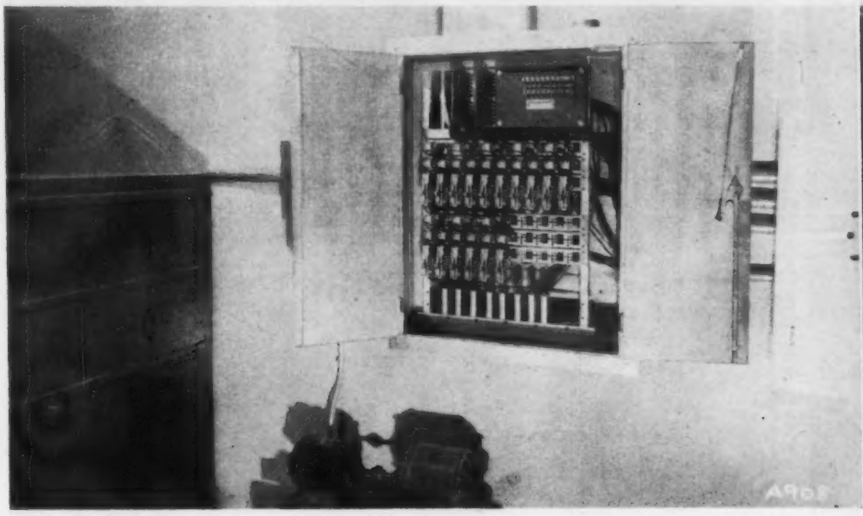


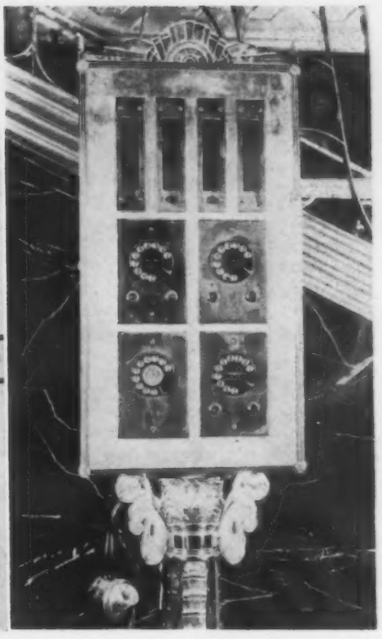
Between the organ grilles and the proscenium opening on each side is a fluted column 55 ft. high with a 5-ft. radius. One-third of the circumference is exposed and is made of extruded aluminum sections arranged as shown in the drawing. The interior has a flat white diffusing finish, the exterior a velvet finish. Illumination is from the interior (right) with three vertical lighting strips equipped with chromium plated reflectors and color rondels on 9-in. centers

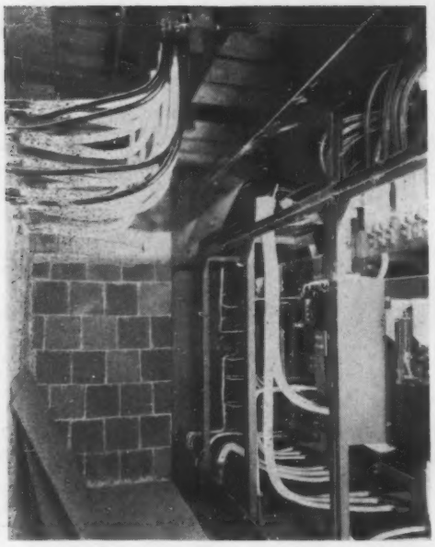


Refrigerating machine and pumps (at right), part of the Carrier downward diffusing heating and ventilating system. Two units, one for the house and one for the lobbies, foyers and rest rooms, are equipped for temperature and humidity control. Air is brought in ducts into the light chambers above the ceilings and diffused through the fin ceiling. The exhaust is through vents under balcony and orchestra seats

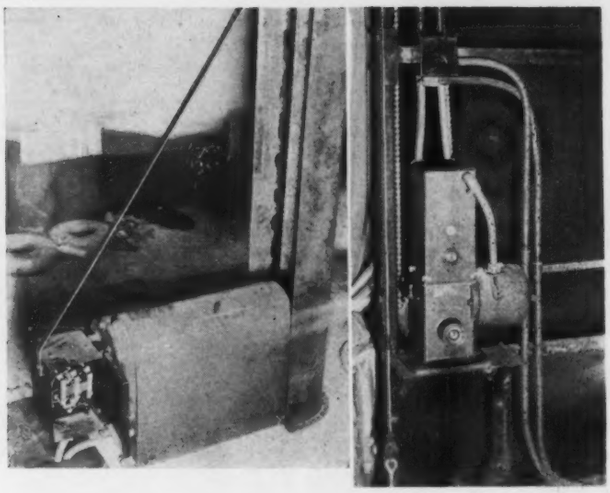
Below is the telephone equipment room, with equipment for the inter-communicating system at the left, two contact panels for the ushers' Tele-Chec system on the wall (one open) and the motor-generator set which supplies 24-volt d. c. to operate the systems. The Tele-Chec system consists of automatic telephone-type dial-sending stations located at each aisle entering the house. These transmit signals indicating the number of seats available to sub-master stations in the foyers and thence to the grand master station (seen at right) in the main lobby, which signals vestibule doorman







The main switchboard is a Frank Adam Switchfuz dead-front, live-rear board with I-T-E inverse time limit, trip free, three-pole air circuit breakers of 3,000-amp. and 2,000-amp. capacities for light and power. In addition to the regular 120/208 volt service from the network (see p. 186) there is a single-phase 120/240 volt service for emergency lighting. A mechanically held contactor is provided in the emergency feeder to the emergency lighting panel with a control station and pilot light under a locked glass door in the entrance vestibule

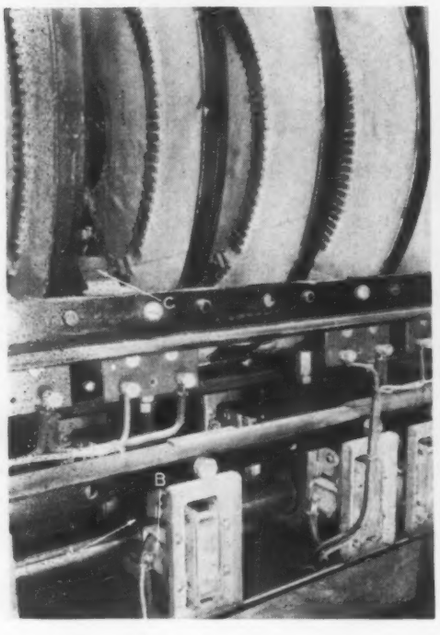


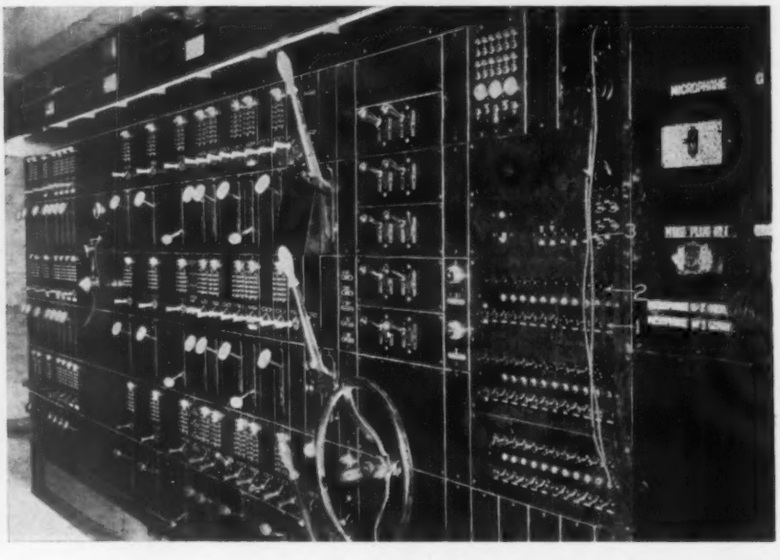
All four stage curtains are operated by three-phase reversing motors with reversing starters equipped with 48-volt d. c. coils. The main draw curtain motor is shown at the left. Control of all curtains is by momentary contact switches

The picture sheet magnascope control (right) consists of two motor-operated mechanisms which draw side tabs and top tabs to give three sizes of screen. These are mounted on the screen, as are the sound horns

Service and Control

At the right of the stage pilot switchboard (below) is the remote control station for the house lighting. Control wiring is run in special cables from this station to the motor-driven dimmer switchboards (lower left) located in an upper room, the system being supplied 48-volt d. c. by a motor-generator set. These dimmer boards are built in three units, one for each house color and each on a separate feeder from the main switchboard. Each board is made up of two sections, one for the contactors and one for the motor-operated resistance-type dimmers. A three-phase constant-speed, non-reversing motor drives three pinion shafts by means of chain drives. There is a pinion (A) for each set of dimmer plates. The dimmer drive is arranged with a double rack rod which is meshed with one side of the pinion by a 48-volt solenoid (B), thus running the dimmer up or down, depending upon which solenoid is operated. When the dimmer is operated to "black out," the dimmer lever trips a mercury switch (C) which opens the line contactor. The master control station on the stage board consists of two double-pole, double-throw cam keys for each control unit. The upper key (2) is momentary contact in the up position and brings the individual dimmer from "off" to any position up to full bright. When the key is down, it transfers the controls to a master control. The lower key (1) merely reverses the process, bringing the dimmer from bright to off. Each color group has color master keys (3) which transfer the control to the house grand master

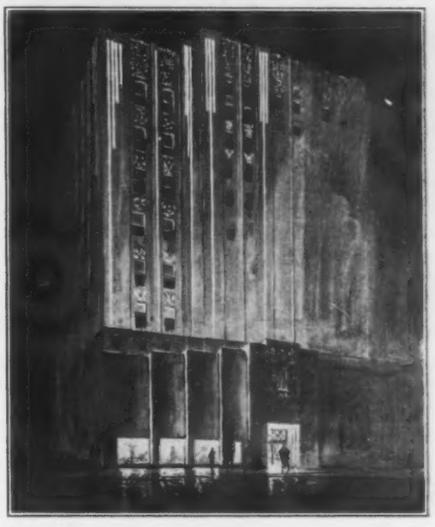




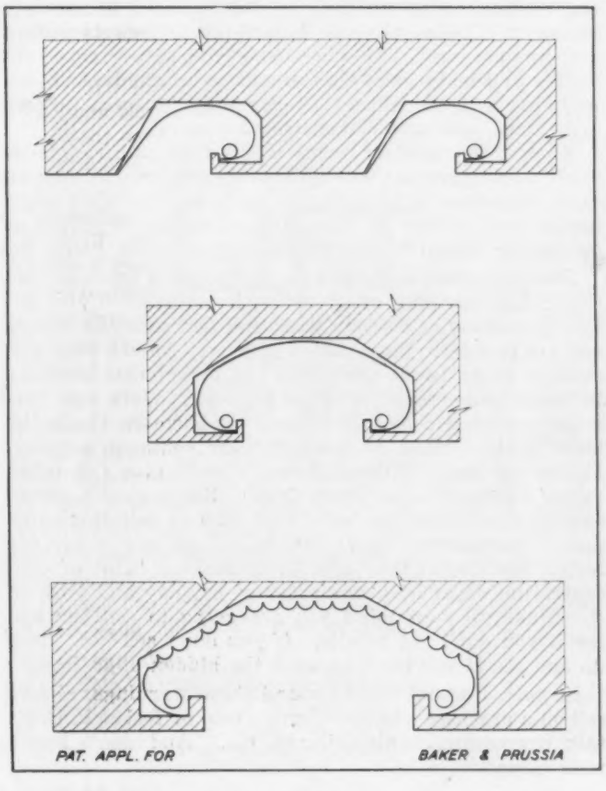
Down With Lighting

Clark Baker Contributes a New Idea to Solve an Old Problem—Other Ideas Are Also Reviewed in the Same Connection

Usually a building is floodlighted in this manner, the units being placed near the base of the building, if incorporated into the building itself, and the light projected upward. This brings high intensity near the base of the structure, which weakens as it goes higher. The effect is bottom heavy, sometimes destroys the architectural character of the building, turns its normal shadows upside down. Architects have long been dissatisfied with this situation and floodlighting has been retarded because of this feeling



Architects much prefer that a building should appear as shown at the right. The upper part of the building is given structural strength and height by lighting elements built into the upper structure. By repeating the emphasis—that is, doubling or tripling the number of lighted panels, the building gains dignity. Floodlighting from near the base may be added without loss of effectiveness



OF THE several methods suggested for the accomplishment of the downward application of lighting to a building, it was natural that Clark Baker, of Baker & Prussia, Oakland, so long an originator of lighting ideas, should develop the most novel means of accomplishing the effect, and one which will benefit many in the electrical industry. His plan has already met with exceptional favor from architects. It consists of casting terra cotta facing tiles with a recessed niche, in almost any desired arrangement. These are attached to the exterior of the building in accordance with the architect's design.

Cross sections of three possible types are shown in the drawing at the left. It will be noted each contains a reflector for the distribution of the light. This can be made of polished or buffed metal. The reflector is needed because it is estimated to be exceedingly costly to glaze the interior surface of a niche in a terra cotta tile, although the casting of the niche itself is a simple matter. Lamp or gaseous tube equipment can be suspended as part of the reflector. Relamping could be cared for by means of a lowered boatswain's chair.

Other methods for achieving this effect are suggested in a pamphlet, "Luminous Architectural Elements," recently issued by the Nela Park engineering department of the General Electric Co. These include structural glass, glass bricks, and other types of panels, lighted from concealed coves accessible from the interior of the building.

A Salesman Sees His Job

L. C. WILLIAMS

WHEN L. C. Williams, Oakland branch salesman for The L. H. Bennett Co., Ltd., was asked by his branch manager to submit his ideas on "How to Increase Business" as part of an intra-branch competition, he gave the matter some thought. As a result, he evolved some concise and expert statements of what a salesman should do to increase his product's distribution and his own success. He wrote:

HOW TO INCREASE BUSINESS

This is a subject in which everyone is interested—now and always. It is one of the foremost thoughts in the mind of every progressive business and sales person. Volumes have been written on the subject and articles appear in almost every issue of many magazines. They all contain some helpful points and I believe we should all spend as much time as possible in reading them and keeping abreast with new ideas.

To begin with, I believe the first and most important thing we have to do is to improve our methods to meet existing conditions. We can do this by:

1. Maintaining right mental attitude
2. Being thorough in our work
3. Having confidence and courage
4. Enthusiasm
5. Sincerity
6. Self-control
7. Concentration and punctuality

These are all very important and necessary requisites in selling. A great deal can be said about each, but my stock of paper is low and it would undoubtedly be boring to you. However, one word in connection with mental attitude, which includes optimism. Conditions cannot change a genuine optimist, but optimism can change conditions. Let's all be optimists.

To continue, the second important thing is to increase our knowledge. This is the only lever by which we can lift ourselves and in turn lift our business. To do this we must know our product and sales talk. When in doubt see how it looks in writing. We are all more careful in writing than talking. Analyze it carefully, rewrite it, submit it for approval of supervisor or friends, ask for suggestions, etc. Know the factors contributing to the process of a sale. These are necessary if you would negotiate without trouble the barriers between yourself and the prospect's signature on the dotted line. The approach and demonstration are by far the most important factors—closing them becomes simple. In these days of house-to-house selling make your approach agreeable by being friendly, pleasant and smiling. There is a lot of psychology in a smile—you know the story—it's catching. Try and arouse curiosity in your approach. It has been said that curiosity killed the cat, but we can be reasonably sure that this element has been responsible for more sales than for cats killed.

Remember, objections are stepping stones to sales (and the common reason why your prospect offers objections is to protect his pocketbook). Create desire during your demonstration. This must be aroused before a sale can be made. Choose your words so that the prospect will easily get a clear picture of all the things our product will do. Taking too much for granted is without question our greatest fault. We give the prospect too much credit for knowledge of the refrigerator. In most cases, selling General Electric refrigerators is still an educational process and must be conducted as such. Maximum sales do not depend upon the number of calls you make, but how you make them. If your approach and demonstration are correct, your sales will certainly increase. Closing the sale is nothing to fear providing you are prepared. It will enable you to overcome obstacles and make sales that otherwise might be lost. Always avoid technicalities. Never allow prospects to talk price until you have demonstrated quality.

Know your product from the buying motive standpoint. An important way to increase efficiency and lessen sales resistance is to know the main motives that make people buy. Some of them are: Convenience, pride of ownership, desserts, health, comfort.

The third part necessary to increase our business and sales: Lay out plan of operation in advance. Know before beginning of the day what and how many prospects you are to meet. Keep record of time. Anyone who will average eight hours can't help but make enough money to take a two months' vacation per year. Work your territory systematically. Don't pass the home that looks the least likely. Make at least 25 new contacts per day. Follow up leads without delay. (Don't give the other fellow a chance to get there first.) Study each prospect carefully. Outline an individual plan to sell this prospect if necessary. Don't fail to call on supervisor for help (that's what they are for). Make a habit of concentrating on at least one prospect per day and stick to it. Make up your mind you are going to sell her and see if you don't get results. If you don't sell her, check up and see if you can't unearth the hidden objections.

In *finis*, I would like to sound these warnings: Don't call on a prospect when you have a cold or feel sick. Don't talk depression, bank failures, etc. And don't knock your competitors.

Personal But Not Confidential

NO story could tell so well how Vincent L. Birkbeck, proprietor of the Good Housekeeping Shop, Atascadero, Calif., sells himself and his wares as can this letter from him to an interested distributor. Atascadero is a small town on the Coast Highway between Los Angeles and San Francisco, but Mr. Birkbeck has no small town ideas about selling. In selling radio and radio supplies, heavy electrical equipment and small appliances, like the mixers mentioned, he has repeatedly broken sales records and attracted attention because of the originality and success of his sales feats.

VINCENT L. BIRKBECK

GOOD HOUSEKEEPING SHOP
OF ATASCADERO

ELECTRICAL LABOR-SAVING HOUSEHOLD APPLIANCES

Nov. 25th. 1931.

- ELECTRIC REFRIGERATORS
- IRONS
- IRONERS
- TOASTERS
- WASHING MACHINES
- LAMPS
- RANGES
- FANS
- HEATERS
- CLOCKS
- PERCOLATORS
- ROOM COOLERS
- HUMIDIFIERS
- DOOR CHIMES
- MIXERS
- WATER COOLERS
- DISH WASHERS
- WATER HEATERS
- FRUIT JUICE EXTRACTORS
- WATER SOFTENERS
- RADIOS
- RADIO TUBES
- GAS RANGES
- GAS WATER HEATERS
- GAS AIR HEATERS

Federal Merchandise Co.
316 Commercial St.
Los Angeles. Calif.

Attn. Mr. E. W. Moore.

Dear Sir,

Replying to your letter of Nov. 25th. I am glad of the opportunity to pass along any sales slants that can be used by others.

I always base the terms at which I will sell an article according to merit, both quality and utility. In other words it has been my experience that some poorly made or unwanted appliances will revert back even tho a third of their total cost has been paid in by the purchaser. On the other hand an appliance like an electric refrigerator is being sold on what has been, until recently, considered an unbusinesslike deal from the sellers standpoint, namely 25¢ down and 25¢ per day. But every housewife either has or wants an electric refrigerator and it is one of the last kitchen appliances that she wants to lose. It has merit.

I consider the Sunbeam Mixmaster in the same category and have adjusted my terms accordingly. It has worked well altho I am in a very small town I understand that I have sold more than any other dealer in the larger towns in the county, and all my customers are pleased. I do not employ salesmen. I have a large table always standing on the sidewalk and on it are at least six mixers —— numbers make an impression. A large sign stretched between the two front legs tells the terms and what the machine will do. Many stop to look and this gives an opportunity to get a down payment of $1.00 and a signed contract with a $2.00 carrying charge added and terms of 50¢ per week on the balance.

"THE ELECTRICAL HOME IS THE MODERN HOME"

OOD HOUSEKEEPING SHOP
OF ATASCADERO

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Continued:

The low terms undoubtedly make for larger sales and even now it is easy to dig down and get a dollar bill and fifty cents a week sounds like it never would be missed —— it sounds like it is being purchased out of the spare pocket money that one occasionally finds loose in one's jeans. Apart from the broadsides of which I am enclosing samples, I have found another good method for a small dealer is to get a stenographer who is working only part time, get her to write a personal letter to a selected list of prospects and give her a dollar per sale regardless of whether of who makes the actual sales —— that is of course those sales to prospects to whom she has written. The dealer is gambling a two cent stamp and some stationery and the girl is gambling time which would otherwise be unprofitable. My sales would have been larger could I have gotten a girl who had the time. I have proven this method and it works.

Whether these slants would work for the dealer in a large city I do not know. But most small town merchandisers know their customers without having to go to the trouble to check up on credit standing. I do not hold the customer to 50¢ per week and most of them pay $2.00 per month. However $0¢ per week is best method of presenting the terms to the public.

I make all records of the transaction on the back of my copy of the contract which saves bookkeeping and in case they get tired of paying by weekly payments and wish to pay off the balance, this plan enables me to quickly determine the balance due and it is all on one sheet of paper.

There may be an objection raised by some dealers of the amount work entailed in the sale of a $22.50 article but it seems to be the order of the day in all sales as under present conditions to have to work harder and make less per sale than we were formerly accustomed to.

Yours very truly,

Good Housekeeping Shop. V. L. Birkbeck

"THE ELECTRICAL HOME IS THE MODERN HOME"

One of the broadsides used in the record-breaking mixer campaign

To Arms—

"Three Musketeers!"

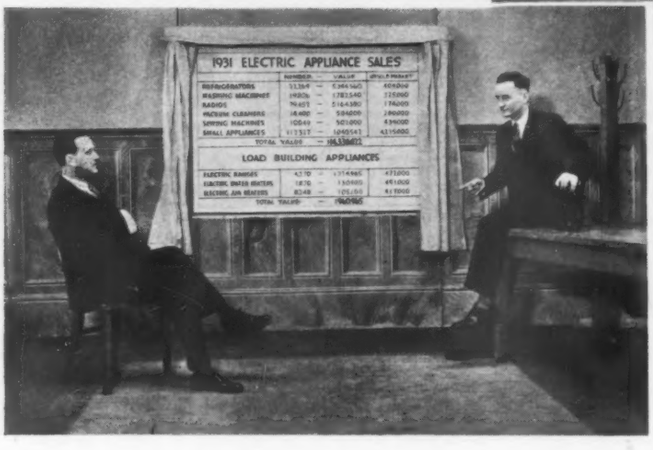
Dealers, Employees and Salesmen in P. G. and E. Territory Are Inspired With 1932's Opportunities and Are Shown the Spirit Which Makes Men Become "Go-Getters" Despite All Odds and Obstacles

Sales Manager Hugh Crawford cites the invincibility of the famous Musketeers, whose slogan is shown above the arches. As he speaks, the pictures (painted on transparancies) change into a salesman—for Athos, employee—for Porthos, and dealer—for Aramis, linked together in a bond of mutual interest. This prologue sets the theme for the sales program of the company

As one salesman to two others, F. U. Naylor, the company sales representative (center, standing), tells A. M. Frost, hardware salesman (right), and F. S. Curren, grocery salesman (left), his company's complete sales program, while the hotel clerk, A. C. Miller, is busy. A screen is dropped to project upon it the details of quotas, advertising backing, and concrete examples of sales possibilities

How employees, such as W. Parks, truck driver (left), O. R. Doerr, gas meter man (center), or A. C. Miller, lineman (right), may sell housewives electric heaters or lamps on spare time as a means of maintaining their incomes, or turn in prospect tips, is told in another skit. Again on the screen are shown details of employee participation plans as well as dealer tie-in on lines not carried by the company

Dealers' interests and potential business are shown in this scene laid in a division manager's office, where B. W. Reynolds, the dealer, discusses with E. F. Perkins, the sales manager, the total appliances sold by dealers last year, the available market, and the company's merchandising of only the heavy load building lines, with dealer cooperation



Fourteen performances, to a total of 7,581 persons, including employees, their families and local dealers, were given, one in each division, on a three weeks' tour covering 1,639 miles in northern California. The troupe of 15 included the cast of ten general office sales executives, General Sales Manager Crawford, W. P. Bear, lighting and sound, and Walter Carlson, G. E. Incandescent Lamp Dept., who operated the Photophone, all of whom traveled with a large labeled truck and identified cars bearing the words, "P. G. and E. Business Builders." Frank Bevan, display manager, was stage director. Messages from A. F. Hockenbeamer, president, P. M. Downing, vice-president and general manager, and R. E. Fisher, vice-president in charge of public relations and sales, were brought by means of talking pictures. They cited the company's problems, pledged their support to a strong commercial program despite all temptations to conservative retrenchment, and invited dealers, employees and their families to participate in business developing.

General Sales Manager Crawford presents at each division a blue cloisonne vase as a reward to the salesman, employee or dealer who will do the best sales job during the gruelling year 1932

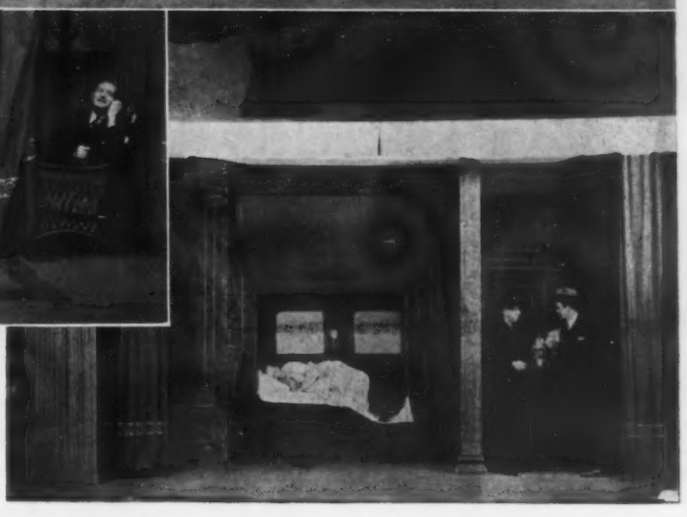
A Plan Deserving Imitation—

by any central station company because it:

1. Strengthens the morale of the sales staff.
2. Acquaints and interests the employees and, more important, their families, in company sales problems; shows them their own self-interest in helping solve them.
3. Defines for dealers the company's objectives and shows them how they may benefit themselves by assisting in the sales job.
4. Has excellent moral effect on the communities visited, because it promises to build trade there and shows the company to be courageous.
5. Builds better trade understanding and tolerance.
6. Provides head office contact with employees, sales staff and the trade in each community, and unifies the scattered sales army outposts and the industry.

Although requiring much thought, planning, rehearsing, some expense and well-spent time away from headquarters, the results are far reaching, and the expenditures are paying investments. For the Pacific Gas and Electric Co. this is its second year of barnstorming through the divisions.

Adapted from Peter B. Kyne's story, "The Go-Getter," "The Blue Vase" is a challenge to stamina in salesmanship. Capt. Peasley (W. H. Park), Mr. Skinner (H. W. Carroll), and Cappy Ricks (Frank Bevan) argue the need for a real man as their Shanghai manager; Bill Peck (F. S. Curren), determined, one-armed veteran, sells himself and carloads of "skunk lumber" so well that he's given the "blue vase test," is sent on an impossible errand, routs out art dealer B. Cohen (A. C. Miller), and finds the vase . . . .



. . . The climax comes in Section A, car 7, which Peck overtakes en route to Los Angeles, delivers the vase and earns the Shanghai managership. This inspiring playlet challenged every division's salesmen, employees and dealers to overcome the great obstacles of 1932, end the year successfully, and each earn his share of the possibilities

It Pays to Push Appliances

FOR electrical merchandise dealers elsewhere the last Christmas season may have been a disappointment, but to nearly 150 merchants in Colorado, New Mexico and Wyoming it was a period of surprising activity. So successful was a cooperative sales endeavor in this territory that the same group of dealers is planning similar spring campaigns on refrigerators, ranges and other appliances.

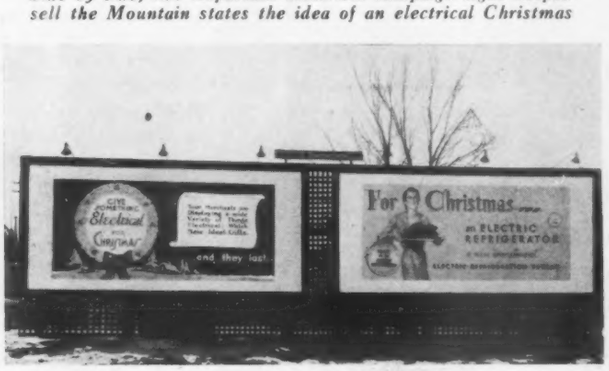
Planning for Christmas business began in October when officials of the Rocky Mountain Division of the N.E.L.A., Electrical League of Colorado, Retail Merchants' Bureau, Hardware and Merchants' associations held a meeting with representatives of various concerns handling electrical appliances—drug stores, department stores, furniture stores, music stores, jewelry stores, etc. It was agreed at this conference that only by coordinated efforts could Christmas trade be stimulated to approach normal levels. There being no argument on this point, George E. Lewis, managing director of the N.E.L.A. Rocky Mountain Division, announced that member companies in Colorado, Wyoming and New Mexico woud furnish a major portion of publicity material necessary for an energetic sales campaign.

The movement took definite form late in November when outdoor advertising all over the three states began to make its appearance, advising: "Give Something Electrical for Christmas." Public Service Company of Colorado used 70 such signs in Denver alone; and at least one was placed in each of the eleven towns outside of Denver where the company maintains district offices.

The Southern Colorado Power Co., at Pueblo and Canon City in particular, used signboards to excellent advantage; so did other electric utilities in the less populous regions of Wyoming and New Mexico.

Meantime, orders for small stickers, bearing the inevitable "Give Something Electrical for Christmas" had been flooding in. These were used by N.E.L.A. member companies and other merchants on December statements. Larger editions of the same stickers for store windows were also in great demand, as were 4-ft. streamers to be displayed in show cases and windows. Pamphlets listing the many electrical gifts appropriate for Christmas were available at N.E.L.A. headquarters in Denver, and these proved to be very popular. Huge billboard posters were requisitioned for use in all three Mountain states. In congested population centers, and on arterial highways, the outdoor signs shouted: "Your Merchants Are Displaying a Wide Variety of Things Electrical Which Make Ideal Christmas Gifts . . . . And They Last."

Side by side, two important electrical campaign signs helped sell the Mountain states the idea of an electrical Christmas



GIVE SOMETHING
ELECTRICAL
FOR CHRISTMAS
ELECTRICAL
CHRISTMAS JOYS
"There's what I call a gift," explains friend wife.
AND WHY shouldn't she? Every electrical gift that you give her for use in your home goes to lighten her work, to perform some task easier and better. Every electrical gift you give her saves her energy, and gives her more leisure hours, and keeps her young longer.
WAFFLE IRON, TOASTER, VACUUM CLEANER, ELECTRIC IRON, ELECTRIC FLOOR WAXER, ELECTRIC GRILL, CURLING IRON—all time savers, and all performing some task at a minimum of effort and time.
Put electrical gifts on your shopping list this Christmas. Those who receive them will welcome them for their usefulness.
The stores listed below are able to furnish you with the latest and best electrical Christmas gifts at very reasonable prices.
UNITED HARDWARE CO.
THE ELECTRIC SHOP
A. C. PARSONS, Jeweler
SCHMIDT HARDWARE
W. W. MURCOTT, Jeweler
BANNISTER FURN. CO.
TEMPLEMAN JEWELERY
MESA DRUG STORE
TREECE FURNITURE CO.
PUBLIC SERVICE CO.
WINTERBURN ELECTRIC
BOND FURNITURE CO.
ANDERSON FURN. CO.

Typical of the spirit, all electrical outlets in Grand Junction, Colo., combined to finance this and other advertisements in the local newspaper

Tying in with the visual publicity was a series of day and night radio programs in December with the signature: "Sponsored by the Rocky Mountain Division, National Electric Light Association, together with hardware, furniture, jewelry, music, department stores, specialty stores and other dealers in electrical merchandise throughout Colorado, Wyoming and New Mexico." The broadcasts featured the "good old days" before modern invention brought living standards to their present plane, and originated at KOA, General Electric's 12,500-watt Denver station, which completely blankets all three Mountain states. General Electric Co. devoted parts of its regular programs to the trade relations campaign, and individual merchants picked up the "Buy Something Electrical" idea and promoted it vigorously via radio.

Newspaper advertising was a factor of vital importance. The electrical industry devoted many pages of display advertising to boosts for local merchants. Capitalizing this publicity, dealers ran advertisements to ally themselves definitely with the movement. There were numerous instances of merchants clubbing together on a full- or half-page spread, advocating: "Give Something Electrical."

Executives of electric utilities issued requests that members of their organizations buy at least one electrical

gift for Christmas "not necessarily from this company," pointing out that all dealers in electrical merchandise should be patronized. All Southern Colorado Power Co. employees pledged themselves to such a program. This concern allotted generous space on its sales floor at Pueblo to a Christmas display for local music, hardware, drygoods, furniture, jewelry and other dealers in electrical equipment.

Most spectacular displays in the cooperative effort were made by hardware dealers. One dressed his windows on both first and second floors with stickers and banners, giving his most valuable floor space, directly inside the street door, to all types of electrical appliances; another supplemented the group movement with 26 outdoor signs featuring electrical goods.

Surveying the situation in January, John E. Loiseau, energetic president of the Rocky Mountain Division, N.E.L.A., discovered that 54 towns in the three states used campaign material. Mr. Loiseau, who is secretary of Public Service Company of Colorado, learned also that 20 utility companies were similarly active. A closer analysis divided participating merchants as follows: electrical specialty dealers, 48; hardware dealers, 30; automobile equipment dealers, 5; department stores, 15; furniture stores, 10; drug stores, 26; music stores, 8. Mr. Loiseau has a definite check on this number. Many smaller merchants used materials distributed by the larger concerns, and their names would lengthen the list of participants almost indefinitely.

Some conception of the campaign's magnitude may be gained from the fact that almost a quarter-million bill stickers were used; 5,000 large stickers occupied window space and were plastered on trucks and automobiles; 3,000 streamers carried there messages in show cases and store windows; 75,000 gift suggestion pamphlets were placed in circulation; 150 billboard posters were requisitioned.

Throughout the territory affected by the campaign came reports. . . . . "Without the stimulus of the N.E.L.A. program, sales would have fallen flat." . . . . "Christmas business exceeded that of last year." . . . . . "For the first time ever, I had to reorder food mixers and other appliances as many as four times to meet customer demands." In several instances, dollar income at Christmas time did not equal that of 1930, but a greater number of transactions took place with (in view of lower cost) higher net revenue; in others, dollar income, even, was larger.

It is already agreed that the 1931 Christmas campaign will be repeated in 1932.

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Recruiting Rangers From Refrigerania

How a Distributor and Dealer System is Being Trained to Attack and Conquer the Citadel of Domestic Load and to Occupy It With the Electric Kitchen Complete

IF "REFRIGERANIA" began as a sales game between the various distributorships of the General Electric refrigerator, with the presidency of this mythical republic as the goal for highest percentage of sales to quota, the inspiration of its organization is being made to serve a very useful purpose in this second year of its operation. Refrigerania not only has declared war upon sales resistance to refrigeration but is girding for a second line of offensive on the American home with the electric range, the first of several waves of sales effort with which it is planned eventually to occupy the home with the electric kitchen idea.

Details of the changeover in distribution policy on ranges were given in ELECTRICAL WEST, Jan. 1, 1932, p. 49. It is the training of a refrigeration minded organization of salesmen and dealers, set up to do a specialty sales type of selling, to become equally effective in the selling of electric ranges, to which special interest attaches now. So far, range selling has been considered a problem of its own, unique because of a number of resistances and obstacles, complicated by wiring and requiring patient re-education of prospects and later of buyers. Rates and minimums entered into it. In fact, the range sale took both engineering and selling, and not a little persistence and diplomacy. Could the job ever be done by a specialty organization on a specialty basis? This question has bothered the industry for years.

Perhaps all of these questions proved mental hazards so great that some of the salable features of ranges were overlooked. It is refreshing to see the new attack which this group is making on a veteran piece of merchandise, hear some of the old fundamentals brought forth in new and fresh manner, see a strong quality appeal built into the presentation, so convincing as to surmount even Eastern rates and to sweep boldly over installation costs and full selling price to a triumphant sale.

Refrigerania's sales organization of dealers and salesmen in the West, as in other parts of the country, was mobilized at a series of two-day meetings at the head-

Official news sheet, The Monitor Top Dispatch carried heavy streamers "Refrigerania Declares War," told in print the double campaign story

ONITOR TOP DISPATCH

EFRIGERANI

ECLARES WA

War Proclamation

quarters of the distributorships. The groups were first called together to hear the 1932 sales story and imbibe its new charge of sales energy. They were held over to listen to a story, new to many of them, of the electric range, instrument of electric cookery, and how the General Electric Co. was planning to utilize every facility of the national range campaign of N.E.L.A.-N.E.M.A., every avenue of national and local advertising, to sell its share of the three-year, 1,000,000 range total.

The refrigerator troupe, headed by A. M. Sweeney, manager of production, former manager of the National Lamp Works, at Oakland, consisted of T. H. Dow, T. A. Millott, K. R. Davis, H. T. Hulett, C. J. Enderle and M. J. Young. By means of charges brought against the G. E. refrigerator—the sales obstacles usually encountered by salesmen and dealers—before the Court of Refrigerania, and the overwhelming defense made by the attorney, and the witnesses called, a swift and convincing review of the selling features of that product was made. A stirring talkie news reel of the declaration of war upon sales resistance was a novelty in keeping with the year's sales game.

Twenty-five calls per day per salesman, to arrange for night conferences between salesman and prospect and wife, are the basic strategy of the year's refrigeration selling drive. The market is to be overwhelmed by sheer numbers of contacts.

On the other hand, the range program, presented the second day of these two-day affairs, felt its way cautiously. It lacked some of the assurance and veteran audacity of the successful refrigeration troops. But it marched steadily on, point by point, to a convincing finish. The western troupe was headed by D. C. Marble, and included Clinton Brown, Charles N. Willard, and Myrtle Turney, home economist.

Mr. Marble hammered at each of the questions on electric cookery, told of the plan to discard previous selling plans, create a universal desire for electric cookery, remove some of its obstacles by improved design and exclusive features, and to sell ranges as a specialty should be sold, with ample margin and backed by heavy barrages of advertising. He proved that the electric range is acceptable, has a big market since everyone cooks, warned that it was a dangerous business to play with but profitable to work at, is an attractive proposition to dealer and salesman, will be backed by a national drive. He told what to do—install a range oneself, study the courses on selling them, subscribe to the dealer application principles and practices, consult with the distributor, keep at it; then what pitfalls to avoid—lack of specialty sales organization, ignorance of territory, lack of man power, insufficient training, lack of supervision, lack of a home economist to help sell, and inadequate wiring installation.

Cooking Demonstration

A cooking demonstration, in which two plain salesmen were taught how to cook a complete dinner by the home economist, suggested that all salesmen must first learn to cook on a range to be able to sell it. The troublesome low-priced range situation was dramatically debunked by Mr. Marble by literally stripping the range of all its features and then adding up the dollar value of these features to the housewife, demonstrating thereby the selling features of the range. A strong point was made of the increase in dealer margin on the quality price as against the bare stove selling at a low price.

A very homey and natural talking picture, prepared by Clinton Brown, told individually the ten great selling features of the range, after each of which Mr. Marble evaluated them in cents per meal, a clever and strong selling idea. These, briefly, were the values which a family should be willing to pay for the privilege of enjoying electric cookery: Modernity 1 c., speed 1 c., economy 2 c., cleanliness 2 c., simplicity 1 c., certainty 2 c., coolness 2c., healthfulness 2 c., safety 2 c., and time releasing 4 c. These total 19 c. a meal, 57 c. per day, or for a year, $207.48, well in excess of operating cost at even high rates. A thirty-day month would be evaluated at $17.10, whereas actual costs run around $4.50 a month average, allowing plenty of leeway for downward revision of all of these advantages by the customer and still place electric cookery in a favorable position.

If the end of this array of sales reasoning and advertising programs left many of the battered veterans of range selling wondering whether these fresh new troops from Refrigerania would turn the tide to victory after their own trying years in the trenches, it did arouse these new sales forces to a wonder that they had never realized the opportunities, the selling advantages in electric cookery before, and a determination to start the drive right now.

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Plenty of Reasons To Crow

FROM the farm of Mrs. George Paull, Preston Idaho, came the eggs for this window display of the Utah Power and Light Co. The smallest is 1½ in. long and the largest, at the extreme rear, is nearly 4 in. from end to end, if an egg has an end. Mrs. Paull had recently installed lighting in her chicken roosts, and the improvement in color and size of the eggs led to an inscription on each one, such as: "Before U. P. & L. Service," "Result of First Lighting," "Forgot Lights, Result Dark Eggs," and on the largest, "Would You Advise Us to Continue?". There are positively no turkeys or ostriches on this ranch.

Would You Like A FREE Vacation?

NOW that the income tax puzzle has been solved, keep on the thinking cap and get in on the $100 prize offered by the Pacific Coast Electrical Bureau and ELECTRICAL WEST for the best name for describing and selling electric heat. Just one good idea is all that you need and that $100 may be yours in June. Just like a vacation rolled up and delivered without charge.

If you have forgotten the rules printed in last month's announcement, freshen up a bit. Or, if you missed that announcement, read the rules carefully this time. Then send in your suggestion. That's the important part—getting your entry before the judges so that they will have a chance to pass upon it.

Remember you may send in as many names as you wish and as often as you wish. Some of the contestants have already sent in eight or ten names at once. You may do the same. It gives you just that much more opportunity to have one of your suggestions chosen for that grand prize. So if you have mailed in a name already, mail in some more. Maybe that last name will be the winner.

This is important: A premium will be placed on the shortness of your suggestion. It was previously announced that only names of one or two syllables would be acceptable, but the judges have decided to interpret that rule so that any name will be eligible for the prize, just so it has euphony, salability, descriptiveness and the other attributes mentioned. But if your name is short, so much the better. Now "electric" has three syllables: e-lec-tric. It might be a good idea to stay away from that word, if you can, because it runs up the count.

No matter what you send in, get it in now, because you are then certain that it will be received. If you put it off until later, you might forget your one-hundred-dollar idea.

RULES

1. *Names submitted should be short (preferably of not more than two syllables) but any name is eligible if it meets other qualifications imposed.*
2. *Suggested names must be printed in ink or typewritten on one side of the paper. Name, address and occupation of contestant must be written on reverse side of the page.*
3. *Entries must be postmarked prior to midnight May 31, 1932, to be eligible. Suggestions will not be considered as valid entries unless received by the sponsors.*
4. *All entries must be addressed to CONTEST EDITOR, ELECTRICAL WEST, 883 Mission St., San Francisco, Calif., U.S.A.*
5. *Anyone is eligible to submit suggested names except the judges and families of the judges.*
6. *Judges will be the Board of Directors, Pacific Coast Electrical Bureau.*
7. *Decision of the judges will be final.*
8. *Duplicate awards will be made if the winning name is duplicated.*

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Miniature House Has Many Display Uses

OFF and on for the last several years the H. L. Miller Co., an electrical firm in Pasadena, Calif., has used a model house (3 or 4 ft. long and about 2 ft. high) very effectively in window displays. Of stucco construction, the house is typically Spanish and Californian in its make-up, and is a model of the first all-electric home in Los Angeles.

The little house has been especially well adapted to construction windows. For instance, when the firm wished to emphasize the idea that, while wiring jobs might all look alike on the outside, there could be vast differences on the inside, three pairs of twin panels were prepared, each showing a type of wiring and a finished wall. The first pair showed in one panel between exposed studding the knob and tube method of wiring and then the finished wall; the second pair showed the flexible conduit method and then the finished wall; the third pair the rigid conduit method and then the finished wall. The three panels showing finished wall all looked alike, but the three open panels showing the wiring revealed to the public the difference in jobs, differences always covered up and not generally recognized or understood. Occupying the center of this window was the little house, well lighted and cheerful looking, the implication being that the home was far too precious an entity to be endangered by any cheap form of wiring.

For advertising radios, the little house was equipped with an antenna, the electric lights glowing, the idea being that within was a happy family grouped about the fireplace listening to a radio purchased from the H. L. Miller Co. The house has been used in other windows; for instance, to sell appliances. In each it has been a fine salesman.

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"ELECTRIC WIRING FOR THE FARM," a bulletin published by Cornell University, is a full treatise on the possibilities in and selected methods of farm wiring. Complete in 122 pages with numerous illustrations, the booklet includes comprehensive chapters on the National Electrical Code; details of the wiring plan, with emphasis on outlets, branch circuits, entrance service, materials, and miscellaneous considerations, such as grounding, contracts, radio interference and wiring system maintenance.

Network Units Adapted To Throw-over Service

Continuity of Service for Oakland's New Theater Is Provided With Network Units, Thereby Minimizing Changes When Load Demands in the Surrounding Area Warrant a Network Installation

By A. W. FLIPPIN[1] *and* P. B. GARRETT[2]

IN the midst of the most rapidly growing section of the business district of Oakland, Calif., there has arisen a magnificent new motion picture theater—the Oakland Paramount. It is electricity that makes such a modern palace possible and the huge electric sign on the exterior is emblematic of the motivating force within.

To serve this new electrical load, the Pacific Gas and Electric Co. has installed power supply equipment interesting in that standard combination low-voltage network transformer units have been adapted to automatic transfer service, later to be incorporated in a network system. This is believed to be the first installation of its kind.

There is a total connected theater lighting load of 1,015 kw. and a motor load of 465 hp., the largest motor being 150-hp. wound-rotor type.

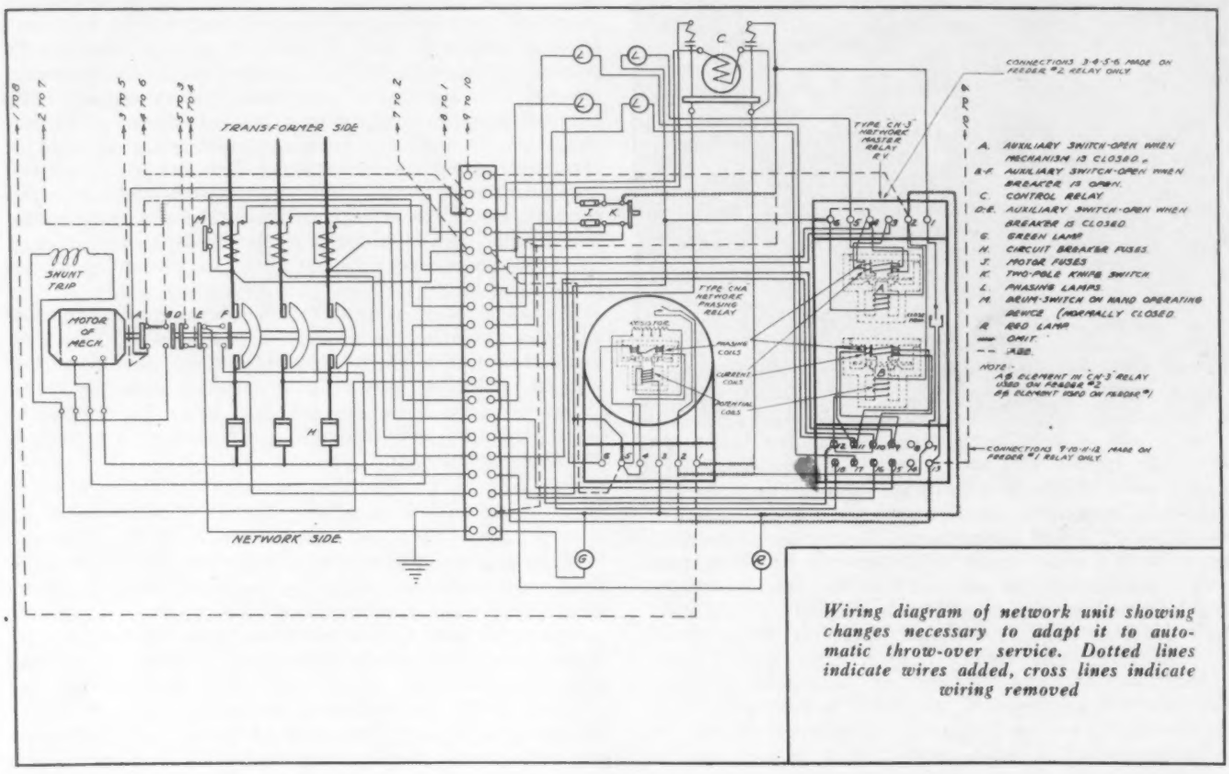
As the electrical load density in the area surrounding this new theater is increasing very rapidly, continuation of normal growth should warrant the installation of a low-voltage automatic network system in the near future. In the meantime, automatic transfer service must be provided. This involves a preferred feeder and a standby feeder, fed from separate power sources, with provision for automatic transfer of the load upon power failure.

It was found entirely practicable to install standard combination network units initially and adapt them to automatic transfer service. This required no equipment external to the standard network units to obtain the operating features incident to automatic transfer service. External modifications were limited to the protectors and consisted of simple changes in wiring, relay adjustments and contactor coils.

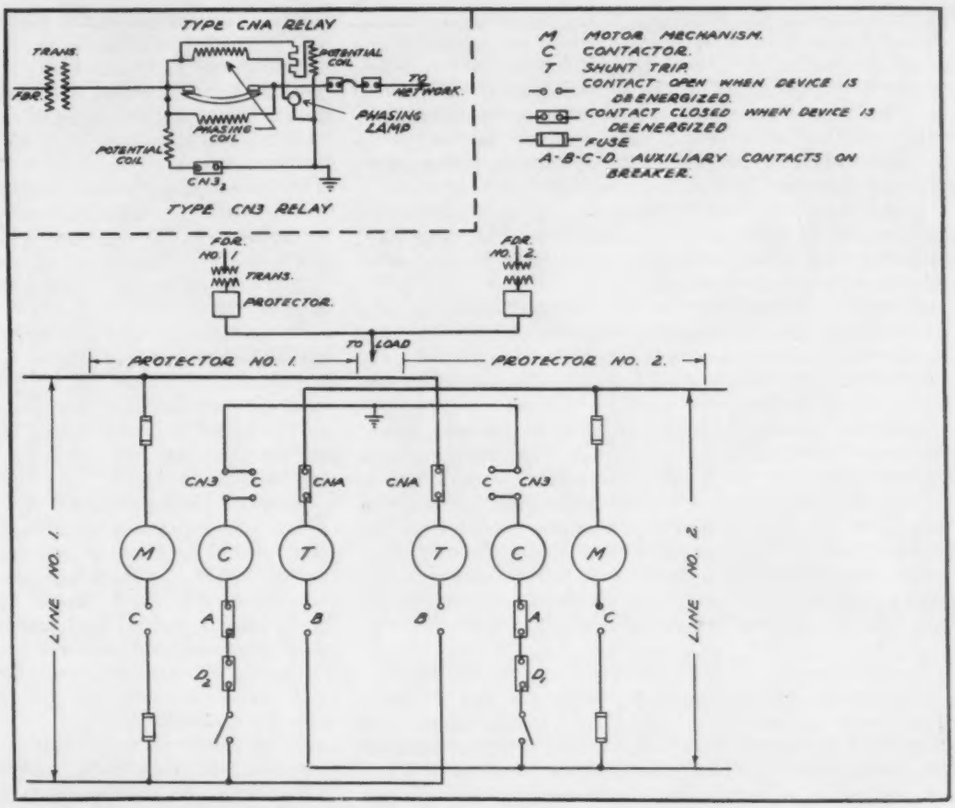
Two standard subway type 300-kva., combination network units were ordered from the factory. Each of these consists of a 300-kva., 3-phase, 60-cycle, 12,500/125-216-volt, delta star O.I.S.C. transformer, equipped with a bolted-on type three-position disconnect and grounding switch with magnetic interlock, and a type CM-2, 1,200-amp., automatic network protector. The protectors are the motor operated type incorporating the roll-out feature and are manually, mechanically and electrically trip-free.

Each transformer has four 2½ per cent full capacity taps and also incorporates a three-phase reactor with

[1]Assistant Superintendent of Underground Department, Oakland Division, Pacific Gas and Electric Co.
[2]Engineering Supervisor, Westinghouse Electric & Manufacturing Co., San Francisco.

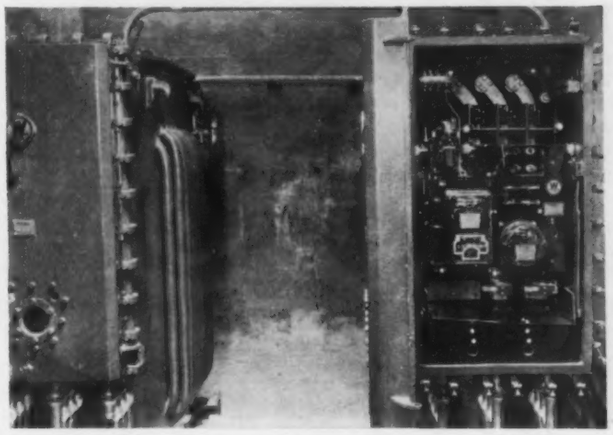

TRANSFORMER SIDE
NETWORK SIDE
SHUNT TRIP
MOTOR OF MECH.
TYPE CM-3 NETWORK MASTER RELAY
TYPE CHA NETWORK PHASING RELAY
PHASING COILS
CURRENT COILS
POTENTIAL COILS
A. AUXILIARY SWITCH-OPEN WHEN MECHANISM IS CLOSED.
B-F. AUXILIARY SWITCH-OPEN WHEN BREAKER IS OPEN.
C. CONTROL RELAY.
D-E. AUXILIARY SWITCH-OPEN WHEN BREAKER IS CLOSED.
G. GREEN LAMP.
H. CIRCUIT BREAKER FUSES.
J. MOTOR FUSES.
K. TWO-POLE KNIFE SWITCH.
L. PHASING LAMPS.
M. DRUM-SWITCH ON HAND OPERATING DEVICE (NORMALLY CLOSED.
R. RED LAMP.
OMIT.
ADD.
CONNECTIONS 3-4-5-6 MADE ON FEEDER #2 RELAY ONLY.
CONNECTIONS 9-10-11-12 MADE ON FEEDER #1 RELAY ONLY.

Wiring diagram of network unit showing changes necessary to adapt it to automatic throw-over service. Dotted lines indicate wires added, cross lines indicate wiring removed



Right—Schematic and elementary diagram of network unit

Below—The two units providing automatic throw-over service are installed in an underground vault adjacent to the theater. The terminal board added for convenience in bringing control wires between the units is shown at the upper right of the open protector



four 1¼ per cent taps, permitting an increase in impedance from the normal value of 5 per cent to 10 per cent. The transformer and reactor tap connections may be changed by means of external operating handles.

Three bolted-on type high-voltage junction boxes are mounted just below the disconnect and grounding switch. Each junction box incorporates three 3-conductor potheads for 500,000-circ.mil cables. Each protector is provided with twelve combination porcelain-ring wiping nipples for single-conductor 500,000-circ.mil lead-covered cables.

Service cables from the theater switchboard to the transformer vault consist of twelve 700,000-circ.mil rubber-insulated, lead-covered, single-conductor cables and four 400,000-circ.mil neutrals placed in four 4-in. pipes for 120/208-volt, three-phase lighting, and nine similar cables placed in three 4-in. pipes for 208-volt three-phase power. After careful consideration of all the details it was decided that the 21 cables would not readily lend themselves to lead-covered cable connections directly into the network protectors. A small bus therefore was installed on the vault ceiling directly opposite the entrance of the 21 cables into the vault. This gave the minimum amount of cable in the vault and avoided the use of a large number of multiple lead-covered cable splices.

Nine 500,000-circ.mil rubber-insulated, lead-covered single-conductor cables were installed from each protector to opposite ends of the bus. The vertical cable supports are made from 1½-in.-thick maple with a lead collar around the cable where it is clamped in the support. The supports are placed at the top and bottom cable bends and midway between, the spacing being 3 ft. Three to 5 ft. of lead armor was removed from the cables connecting to the bus and fireproof taping applied. The two 11-kv. feeder cables were installed with as much separation as possible, but as an extra precaution double fireproofing was applied to each cable.

Accompanying diagrams illustrate schematically the present scheme of operation and the protector wiring modifications necessary to accomplish the desired results. These changes were made at the Pacific Gas and Electric Co. warehouse in Oakland by the manufacturer's service engineer.

The original factory winding was left intact and where necessary was simply disconnected and dead-ended. Whereas the original wiring is of a slate color, the added wiring is black in color so that when the time arrives to change back to the original wiring, it will only be necessary to remove all black wires and re-connect the original wiring to the proper binding posts.

Ten wires are required in the cross-connections between protectors. These terminate at special terminal boards which were provided in each protector and to which all internal temporary wiring is run.

One of the power sources is a preferred source and the

protector associated with this feeder is normally closed. Power failure on this feeder results in a transfer to the alternate source, but resumption of power on the preferred source does not cause the equipment to transfer back again, as this would involve a second and unnecessary interruption of power supply to the theater. Subsequent failure of the alternate power source would of course cause the equipment to transfer back to the preferred source. Normally, however, the equipment will be transferred back to the preferred position manually, and at a time when a momentary interruption is of no consequence to the theater.

Electrical interlocking of the two protectors is provided so that under no condition can they both be closed since, under certain system operating conditions, the two feeders may be fed from power sources which are not in synchronism.

Tripping energy is taken from the alternate power source in each instance. In case the alternate source is not energized, the protector will not trip upon loss of voltage but the tripping circuit will remain set up so that if power is restored on the other feeder first the closed protector will trip immediately and the open protector will close. If power is restored first on the feeder with the closed protector, it will again supply the load without further action.

Wiring Changes

The wiring changes, together with changes in relay adjustments, converted the type CN-3 master relay into essentially a "power indicating" relay, which supervises the closing operation, and changed the type CNA phasing relay into a voltage relay, providing tripping upon loss of potential.

The control spring of the type CN-3 relay is normally arranged to close the front or "closing" contacts when the relay is deenergized. To fit the revised scheme of operation it was necessary to reverse the torque of the spring so as to close the back or "trip" contacts when the relay is deenergized. This change was made very readily and quickly by means of the spring adjuster provided in the relay.

Only one element of the three-element type CN-3 relay is utilized in each case, the "A" phase element being connected in one relay and the "B" phase element in the other. In each instance the phasing coil was left connected across one pole of the protector, the current coil was entirely disconnected and the potential coil was changed over from the network side of the protector to the transformer side so that when the transformer is energized this relay sets up to close the breaker.

Utilizing but one element of each type CN-3 relay and connecting each to a different phase of the two feeders, provides automatic transfer when a protector is tripped manually by means of the external operating handle, regardless of any possible difference in voltage on the two feeders.

For instance, assume all three elements of each of the type CN-3 relays connected as described for the one element. Further assume feeder No. 1 to be the preferred source and that due to power failure on this feeder an automatic transfer has been made to standby feeder No. 2 followed by resumption of power on feeder No. 1. At some convenient time thereafter it is desired to transfer the load back to the preferred feeder by manually moving the external operating handle of protector No. 2 to the "open" position. Protector No. 2 would trip, but if the voltage on feeder No. 2 happened to be higher than on feeder No. 1, there would be a flow of current in the reverse direction through the phasing coils of the type CN-3 relay of protector No. 1 (the phasing coils being in series between the two power sources) and it would not set up to close protector No. 1 automatically. It would of course be possible to close protector No. 1 manually under these conditions by means of its external operating handle, but this would involve a second manual operation and a longer interruption of service to the theater.

Even if only one element of each type CN-3 relay were utilized and both were connected to the same phase, a similar reverse current condition would be encountered. With the single elements connected to different phases, a series path through any two phasing coils is not set up with both protectors in the open position and thus differences in feeder voltage in no way affect the operation of the equipment.

Type CN-3 relays are equipped with front and back contacts, the moving contact being common to both. To supplement the electrical interlocking of the two protectors through auxiliary switches, the back contact of each of the type CN-3 relays was inserted in the ground side of the potential coil circuit of the corresponding relay in the other protector.

Thus if both protectors are open and one type CN-3 relay is energized in advance of the other, it renders the other relay inoperative as soon as it moves off of its back contact. If both feeders happen to be energized simultaneously, both relays start to operate and thus open both potential coil circuits. The relay with the stronger torque spring setting resets first, re-establishing the potential coil circuit of the other relay and allowing it to move on around to its front contact and close its associated protector.

Since the front contact of each type CN-3 relay is associated with one feeder and the back contact with the other, with the moving contact common to both, it was necessary to connect the latter to ground. This in turn made it necessary to substitute a 125-volt operating coil for the 216-volt coil regularly supplied with the two-pole contactor which controls the circuit of the motor mechanism.

Since no reverse current condition is involved in the automatic transfer scheme, the current coil of the type CN-3 relay is not needed. Furthermore, if left connected, it would produce a torque under normal load current conditions which would tend to hold the front contacts closed. Therefore, upon tripping of a protector due to power failure, its associated type CN-3 relay would have to reset before the other type CN-3 relay could start to set up to close its protector, thus introducing an undesirable and unnecessary time delay in transfer.

Connections Insure Minimum Interruption

With a protector in the closed position, the phasing coil of the type CN-3 relay is shorted out, and with the current coil disconnected, there is no electrical torque, thus permitting the relay to reset due to the torque produced by the torque spring. Keeping the back contact closed in turn completes the potential coil circuit of the other type CN-3 relay, causing it to close its front contacts if its associated feeder is also energized. Thus the closing circuit of the other protector is set up to close the protector immediately should the protector supplying the load be tripped out. This insures a minimum time of power interruption to the theater.

In the case of the CNA phasing relay, it was necessary to change the potential coil connection from the network side of the protector to the transformer side. The control spring torque was made as large as possible so as to minimize the time delay in tripping the protector upon loss of potential. However, under this condition the torque developed at normal voltage by the potential coil and the lag plate alone would not be sufficient to hold the contacts open. It therefore was necessary to connect the phasing coil of the type CNA relay in par-

allel with the potential coil, both connected to the transformer side of the protector. The phasing lamp is still used in series with the phasing coil. In order to obtain a greater phase angle between the potential coil and phasing coil fluxes, thereby increasing the torque, the tap on the potential coil resistor furnished in the relay was changed from the 1-D tap to the 1-B tap. The contact gap was decreased from the customary 1/8-in. to 1/16-in. by loosening the screws which support the moving contact bracket and changing the mesh between gear and pinion about one tooth. With this adjustment, the relay will close its contacts from the full open position in approximately two seconds when totally deenergized and will open its contacts in approximately one second when energized at 120 volts. The contacts will close if the voltage drops below approximately 45 volts.

In previous installations of this nature it has been the practice of this company to install an assembly of transformers and two incoming line automatic switching equipments, consisting of circuit breakers, disconnect and relaying equipment; all separately mounted and, of course, not adapted to network service. If this practice were followed in this instance, all of the foregoing equipment, including the transformers, would have to be removed and replaced with network equipment when the changeover to a network system becomes necessary.

Aside from the future network application advantages, this equipment also possesses the inherent advantages of minimum vault space and savings in material and labor required for installation. If six single-phase transformers, and either separately mounted network protectors and high-voltage disconnect switches or the customary automatic transfer equipment had been installed, instead of the compact combination units, the vault floor space required would have been approximately doubled.

The elimination of possible cable faults between the transformers and the network protectors, by utilizing combination units, is of particular importance.

The success of this installation and the comparative ease with which standard network protectors were adapted to automatic transfer service should encourage similar applications elsewhere.

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Curves Aid Estimates For Underground Circuits

By GEO. H. LOGAN
Los Angeles Gas and Electric Corp.

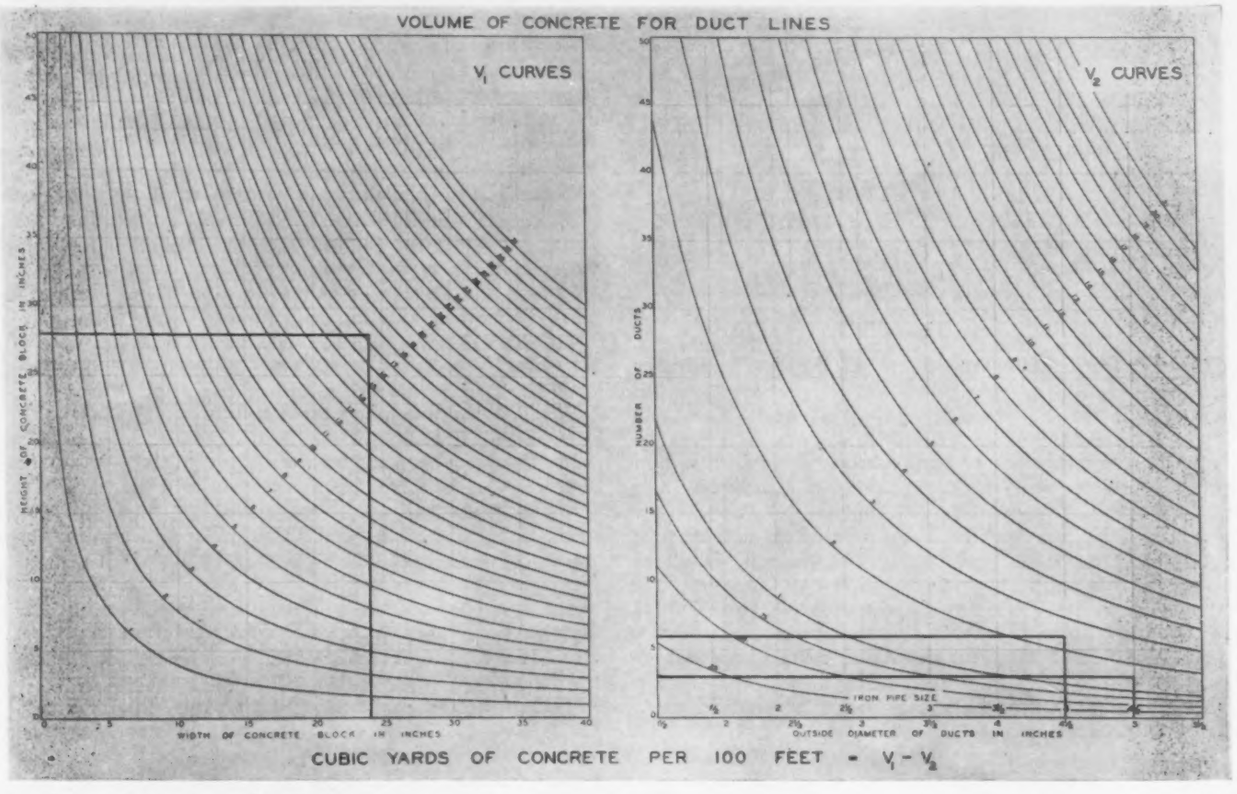
THE curves herein described find use in the preliminary design and planning of underground duct lines. Earth removal necessary may be read directly from the excavation curves for any combination of ditch width and depth. Then utilizing the V_1 and V_2 curves, the volume of concrete for the given duct line characteristics is produced; a simple addition or subtraction is the only calculation required.

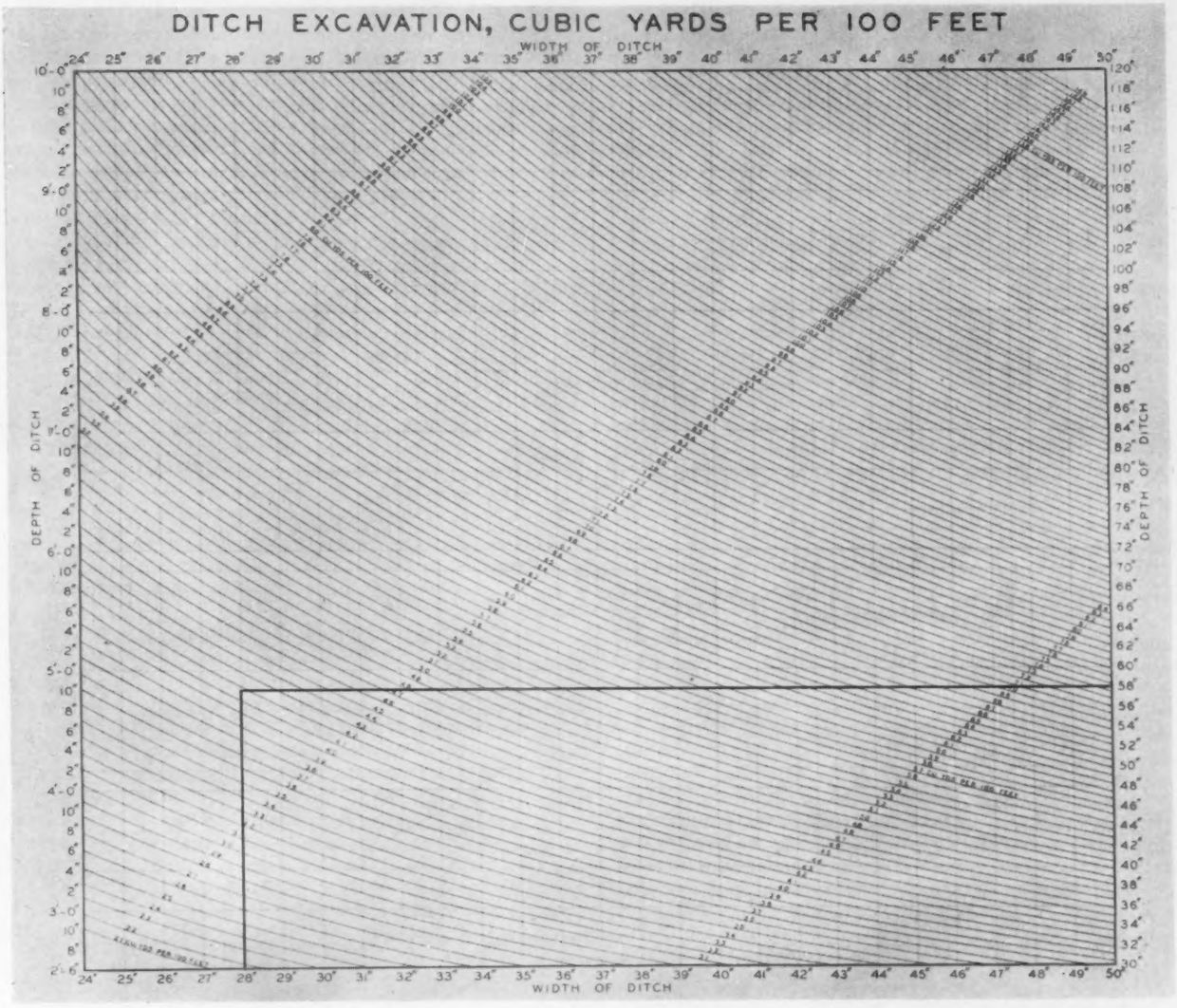
To illustrate the theoretical synthesis of the charts, a resume of the derivation is included. Nomenclature for the curves depicting volume of concrete for duct lines is:

V_1 = volume of concrete of solid cross section, cu. yd./100 ft.
V_2 = volume of ducts, cu. yd./100 ft.
V = net volume of concrete, cu. yd./100 ft.
n = number of ducts
d = outside diameter of ducts, inches
h = height of concrete, inches
w = width of concrete, inches

$$V = V_1 - V_2$$

$$V_1 = \frac{(wh)\ (100)}{144}\ \frac{1}{27}$$


VOLUME OF CONCRETE FOR DUCT LINES
V1 CURVES
V2 CURVES
HEIGHT OF CONCRETE BLOCK IN INCHES
WIDTH OF CONCRETE BLOCK IN INCHES
NUMBER OF DUCTS
IRON PIPE SIZE
OUTSIDE DIAMETER OF DUCTS IN INCHES
CUBIC YARDS OF CONCRETE PER 100 FEET - V1 - V2



$$V_2 = \frac{(n)}{} \quad \frac{(\pi d^2)}{4 \times 144} \quad (100) \quad \frac{1}{27}$$

$$V = \frac{(wh)}{144} \quad (100) \quad \frac{1}{27} - (n) \quad \frac{(\pi d^2)}{4 \times 144} \quad (100) \quad \frac{1}{27}$$

$$V = (0.0257wh) - (0.0202d^2n)$$

The V_1 curves give the value of the first term for any combination of w and h. The V_2 curves give the second term for each desired value of n and d. Subtracting gives the net volume required.

In some combinations pipe size conduit is included to carry conductors in addition to those carried by the ducts. Therefore nominal iron pipe sizes also form abscissa of V_2 curves. The actual outside diameters were obtained from tables, and these oriented on the V chart by vertical dash lines. For combinations embracing two or more duct sizes, the sum of the components of V_2 must be found before subtracting from V_1.

Since the ditch made in preparation for the concrete is of solid cross section, the excavation curves are simply:

$$V_x = (0.0257\ w_d h_d)$$

V_x = volume of earth removed, cu. yd./100 ft.
w_d = width of ditch, inches
h_d = height of ditch, inches

Demonstrating application of the curves to a typical case, consider a duct line 24 in. wide by 28 in. high. There are 6 4½-in. (outside) diameter ducts, in combination with three 5-in. ducts.

At the intersection of the 24-in. and 28-in. dimension lines, V_1 is read 17.2 cu. yd./100 ft.

On the V_2 chart, six 4½-in. ducts give 2.4 cu. yd./100 ft.; three 5-in. ducts occupy 1.5 cu. yd./100 ft. Hence, $V_2 = 2.4 + 1.5$ or 3.9 cu. yd./100 ft.

Then net volume of concrete required is 17.2 — 3.9 or 13.3 cu. yd./100 ft.

If the duct line had contained only six 5-in. ducts, then V would be simply 17.2 — 2.4 or 14.8 cu. yd./100 ft.

If the ditch made in preparation for the installation is 58 in. high by 28 in. wide, then reference to the excavation curve produces 41.8 cu. yd./100 ft. earth removal necessary.

Accuracy to one tenth of a cubic yard per hundred feet is readily obtainable. Errors of computation are eliminated and time conserved. The value of the curves may be enhanced by deriving unit cost factors for local conditions; these used as multipliers will quickly give the expenditure necessary for a proposed duct line installation.

Modern Condenser Design Introduced At La Fresa

Outdoor Installation of the Largest Hydrogen Cooled Synchronous Condenser in the World Provides Engineering and Operating Features of Unusual Interest

By R. B. POLLOCK
Department of Engineering Design,
Southern California Edison Company Ltd.

THE world's largest hydrogen cooled synchronous condenser was recently placed in operation at the La Fresa substation of the Southern California Edison Co. Ltd. This machine, which was manufactured by the General Electric Co., has a rating of 50,000 kva. and is used for voltage regulation and power factor correction of the 66-kv. feeders radiating from La Fresa. The installation was made at La Fresa because it was found to be more economical and desirable to supply the necessary reactive kva. at this location by means of a condenser rather than from the generators at the Long Beach steam plant via the 220-kv. transmission system.

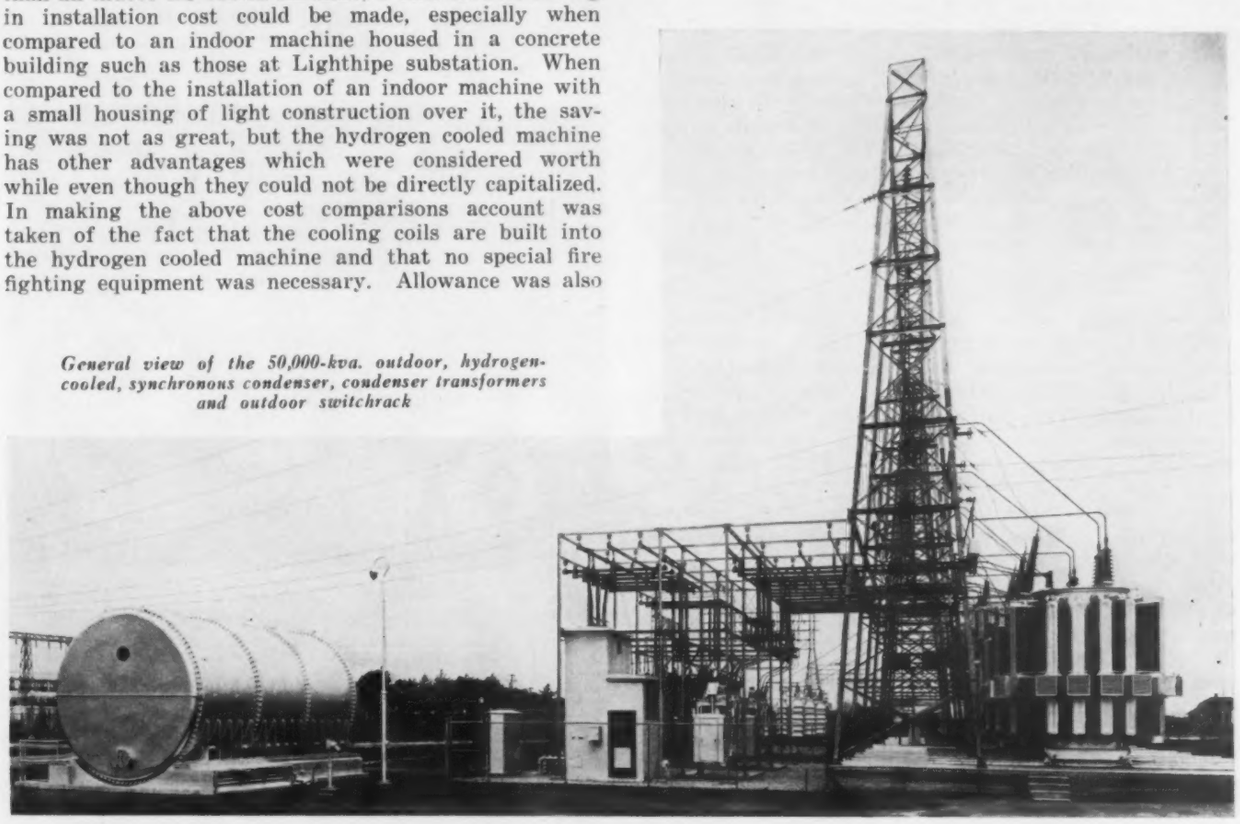
Before selecting a hydrogen cooled condenser consideration was given to the various savings and benefits which could be obtained. It was found that although the hydrogen cooled machine itself costs more than an indoor air cooled machine, a considerable saving in installation cost could be made, especially when compared to an indoor machine housed in a concrete building such as those at Lighthipe substation. When compared to the installation of an indoor machine with a small housing of light construction over it, the saving was not as great, but the hydrogen cooled machine has other advantages which were considered worth while even though they could not be directly capitalized. In making the above cost comparisons account was taken of the fact that the cooling coils are built into the hydrogen cooled machine and that no special fire fighting equipment was necessary. Allowance was also made for a substantial reduction in windage losses due to the low density of hydrogen.

Although this condenser has not been in operation long enough to obtain a fair comparison of operating costs, it is expected that they will be lower than those of an air cooled machine. It costs slightly more to repair a hydrogen cooled machine but repairs should not be needed as often because the housing is dust proof and the insulation is less subject to deterioration in hydrogen than it is in air. The bearing oil should also remain in good condition for a longer time. About $60 worth of hydrogen is needed to refill the machine when such repairs are made as require the removal of the hydrogen from the main part of the case.

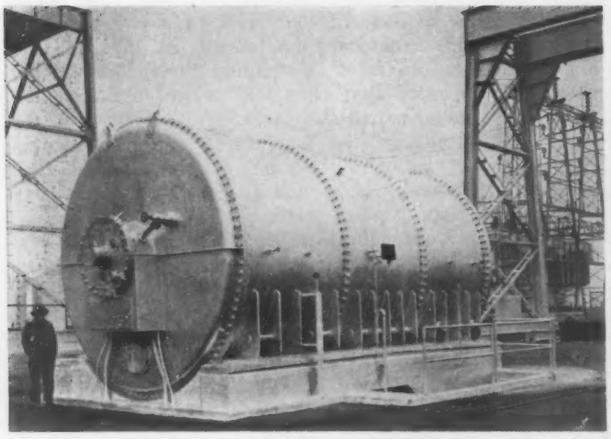
A hydrogen cooled condenser is not essentially different from an air cooled condenser. In fact it is merely necessary to enclose completely the usual indoor air cooled machine in a shell which is gas tight and to provide means for keeping it filled with hydrogen. It is necessary, however, that precautions be taken to prevent the occurrence of an explosive mixture of air and hydrogen inside the case when the condenser is running, as it might become ignited by sparking at the brushes or a breakdown of the insulation.

Operation is started with about 98 per cent pure hydrogen in the machine. It is not difficult to maintain this purity provided that sufficient makeup hydrogen is supplied to keep the pressure inside of the case slightly above that of the outside atmosphere. All of the leakage will then be outward and there will be no tendency for the air to enter and mix with the hydrogen. This pressure is automatically maintained at ½ lb. per sq. in., minimum, by means of a mercroid pressure switch and a solenoid operated valve which admits hydrogen into the condenser from the high pressure storage cylinders. An alarm is given if the pressure inside the case falls below ½ lb.

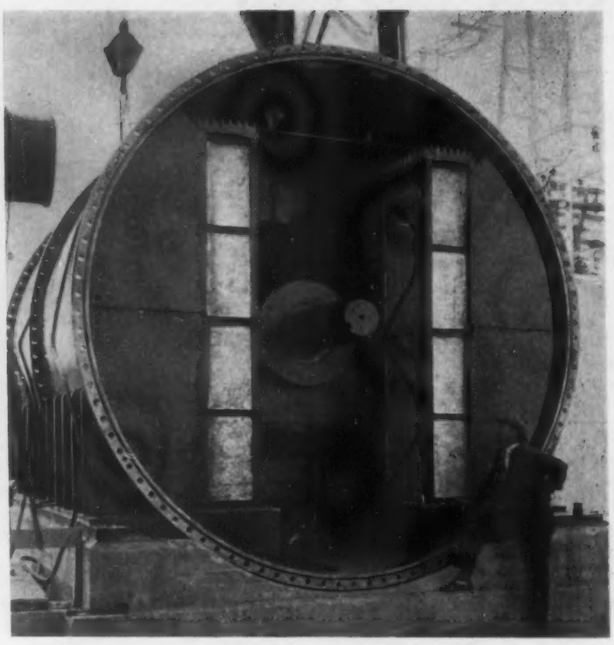
Two methods are used for checking the purity of



General view of the 50,000-kva. outdoor, hydrogen-cooled, synchronous condenser, condenser transformers and outdoor switchrack



Close-up of the collector ring compartment on the condenser. Entrance to the pit housing the hydrogen control devices is shown at the right

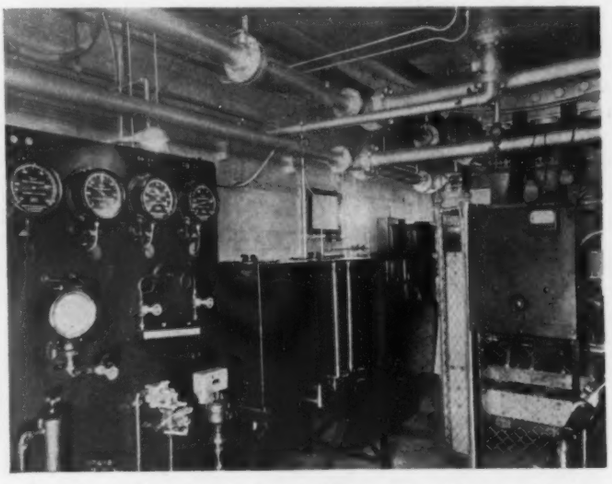


End cover removed from the machine, showing bearing mounting and installation of surface coolers

the hydrogen in the machine. One is by the use of a micro-ammeter which is connected in place of the usual galvanometer in a Wheatstone bridge circuit. One arm of the bridge is composed of a platinum element which is sealed in a cell containing pure hydrogen and the other arm is a similar element except that hydrogen is circulated through the cell continuously from the condenser. The resistance of platinum varies with the purity of the hydrogen in which it is immersed so that the resistance of one arm of the bridge varies with the purity of the hydrogen flowing through the cell. This causes a small current to flow through the micro-ammeter which has its scale calibrated directly in per cent purity of the hydrogen. The other method makes use of the readings of the differential draft gage which measures the slight pressure developed by the fan action of the rotor. Since the rotor turns at constant speed the pressure varies only with the density of the gas mixture. The density is also a measure of its purity so that the readings of the draft gage give an approximate indication of the purity within a range near 100 per cent hydrogen when the condenser is running. If the purity of the hydrogen falls below 90 per cent the condition should immediately be corrected or the machine removed from the line even though the mixture is not actually explosive above 70 per cent.

In a hydrogen cooled condenser it is necessary that the ventilating gas be recirculated and that the heat absorbed by the gas in passing through the core and windings be removed by some means inside the case. This is accomplished in the La Fresa condenser by the use of four internal surface coolers, two at each end of the case. The fan action of the rotor forces the gas outward through the stator core and windings and after passing through the coolers the gas is again drawn in by the rotor. Approximately 400 gal. of water per minute at 88 deg. F. is pumped through the coolers at full load. The piping connections are located on the under side of the case. By removing the lower end plates on the coolers the tubes may be cleaned out without disturbing the hydrogen in the machine. The main bearings are of the self-aligning pedestal type and are supported on the bottom of the condenser case. They are ring oiled and water cooled. The same high pressure pumps which are used to force oil under the shaft when starting the condenser are also used to fill and drain the bearings. An oil level gage is mounted on the outside of the case. The rotor shaft extends a few feet beyond the end of the main case into a small special compartment in which are located the collector rings and brushes. This compartment can be sealed off from the main case by means of a solenoid operated seal when the rotor is at a standstill. Maintenance work may then be done on the brushes with the loss of but a small part of the hydrogen.

The condenser foundation supports the machine on the sides only, the under side of the case being slightly above the ground level so that the rotor and end



Control room under the condenser provides convenient access to the hydrogen control devices and bearing oil supply

sections of the case may be easily removed horizontally. A 100-ton gantry crane is used for handling the heavy parts. There is a pit under the condenser with a stairway leading down to an entrance on one side. The pit was made about ten feet deep and of the same length and width as the condenser itself in order to provide

access to, and working space under the coolers and piping connections. The main stator leads enter the pit from a tunnel and are carried directly to the bushings which are on the under side of the case. The motor driven exciter, field breaker, gage board, bearing oil equipment and hydrogen control devices were installed in the pit since there was sufficient space available. The water pumps are placed outside.

The condenser transformers and oil circuit breakers are located near the condenser. All of this equipment is of the outdoor type. The transformers are Westinghouse and are natural-cooled supplemented with air blast. Their primaries are star connected to the 66-kv. bus and their 12.1-kv. secondaries are connected in delta to the condenser, the secondaries having 4,320-volt condenser starting taps. The condenser starting and running breakers are General Electric Co. type FHKO-239 15-kv., 2,000 and 3,000 amp. respectively. The condenser starting and running busses are made up through these breakers to the condenser leads at the top of a chimney which forms one end of the cable tunnel. A ventilating fan at the base of the chimney forces filtered air through the cable tunnel and condenser pit for removing the heat developed by the motor driven exciter.

Each of the three main condenser leads is composed of four 1,250,000-circ.mil., 16-kv. Kerite insulated cables in parallel. The phases are spaced at the corners of an equilateral triangle by supporting them with maple cleats on the sides and bottom of U shaped copper brackets hung from the ceiling of the tunnel. A ground bar connected to the condenser neutral is carried in the center of the triangle and supported from the same brackets. The triangular phase arrangement equalizes the phase reactance and the central location of the ground conductor prevents the induction of heavy circulating currents in the ground bar. The supporting brackets were made of copper because it was found that iron brackets heated excessively due to eddy currents induced in them.

The control and relay equipment is located on the switchboard in the main control room. Complete automatic push button starting is provided, whereby the machine is brought up to speed and thrown on the line under full protection against improper starting sequence or failure of any part of the equipment to operate as required. The condenser will be shut down and locked out if the pressure of the cooling water is too low, the stator windings are too hot, the phases are unbalanced or the gas temperature is too high during the starting period. If the machine is running the above conditions will simply sound an alarm. The machine will also be shut down and locked out if any of the following troubles develops when the machine is running: overheated bearings, field failure, failure in transformer or condenser windings and water leakage within the case. The condenser will be shut down on undervoltage after a definite time delay but will restart on return of voltage. In all cases of lockout the locking-out relay must be reset by hand before restarting the machine. A visual and audible alarm is given when any of the above troubles occurs.

When the condenser was placed in operation a very noticeable reduction in noise was observed as compared with the usual air cooled machine. The windage noise was completely removed and only a slight magnetic hum could be heard. This reduction in noise is accounted for by the fact that the machine is completely enclosed and also because it is operating in a medium of such low density. The operating temperautres were surprisingly low. This is mainly due to the high thermal conductivity of hydrogen. The cost of the make-up hydrogen has averaged less than ten cents per day during the first four months of operation.

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New Books

PRINCIPLES OF ELECTRICAL ENGINEERING, by Grover C. Blalock, associate professor of electrical engineering, Purdue University. Cloth bound; 6 x 9 in.; 490 pages; illustrated. First edition, published 1931 by McGraw-Hill Book Co., Inc., New York. Price $4. For sale by McGraw-Hill Retail Room, 883 Mission St., San Francisco.—A textbook intended for students in non-electrical engineering courses. Fundamental principles are presented in concise form with frequent references to practical applications and illustrative applications of the principles of electrical engineering. Fundamental concepts of electrical theory are worked into practical and theoretical treatment of electrical engineering problems which are likely to be encountered in the other branches of engineering. Practice problems and a list of laboratory experiments are included to familiarize the student with electrical engineering practice.

RADIO FREQUENCY ELECTRICAL MEASUREMENTS, by Hugh A. Brown, assistant professor of electrical engineering, University of Illinois. Cloth bound; 6 x 9 in.; 380 pages; illustrated. First edition, published 1931 by McGraw-Hill Book Co., Inc., New York. Price $4. For sale by McGraw-Hill Retail Room, 883 Mission St., San Francisco.—In light of the rapid progress being made in the science of radio communication, this book fills a definite need for a comprehensive treatment of the laboratory methods of measuring radio frequencies. Various chapters cover the measurement of capacitance, inductance, resistance, frequency, antenna measurements, thermionic-tube coefficients, wave form, and transmitter and receiver measurements.

Theory and principles are derived and explained and followed by a brief description of the necessary steps in laboratory procedure and manipulation. Finally, a discussion of the precision attainable, precautions and general merits of the method is given. Emphasis is placed on the fundamental principles underlying a theory and the student is given some initiative in working out the details of the problems for himself. The text is intended for senior students in electrical engineering as well as the radio engineer and the experienced amateur.

PRINCIPLES OF DIRECT CURRENT MACHINES, by A. S. Langsdorf, Dean of the Schools of Engineering and Architecture, Washington University. Cloth bound; 8¼ x 5½ in.; 576 pages; illustrated. Fourth edition, published 1931 by McGraw-Hill Book Co., Inc., New York. Price $4.50. For sale by McGraw-Hill Retail Room, 883 Mission St., San Francisco.—This book presents a complete treatment of the fundamental principles that underlie the design and operation of all types of d.c. machinery. Both the physical contents and the mathematical analysis of design problems are included for the component parts of d.c. machines. In addition to material contained in the first three editions, this edition includes a graphical treatment of the operating characteristics of motors and generators, a more extensive treatment of the subject of commutation, and new chapters on the mechanics of motor acceleration and retardation and on motor starting devices and rheostats.

ALTERNATING CURRENT CIRCUITS, by J. M. Bryant, professor of electrical engineering, University of Minnesota, and J. A. Correll, professor of electrical engineering, University of Texas. Cloth bound; 6 x 9 in.; 483 pages; illustrated. Second edition, published 1931 by McGraw-Hill Book Co., Inc., New York. Price $4.50. For sale by McGraw-Hill Retail Room, 883 Mission St., San Francisco.—Text covers the theory of a.c. circuits and the development of equations applying to the various types of circuits from the fundamental physical and mathematical principles. Applications of the theory to polyphase circuits and transmission lines are given in the latter portion of the book. Numerous examples illustrate the application of equations to practical problems and present engineering methods of attacking problems involving intricate equations. Vector diagrams and mathematics of vectors are freely used to develop the equations of a.c. circuits. In the second edition a new chapter on "Consideration of Unbalanced Loads and Voltages in Polyphase Circuits by Means of Symmetrical Phase Coordinance" is included. A set of problems has been added to the end of each chapter to facilitate assimilation of the material therein. The text is intended for junior or senior students in electrical engineering and the clear, concise presentation of this edition permits a more comprehensive study by a student of this subject.

RELAY HANDBOOK AND SUPPLEMENT, by H. P. Sleeper, Public Service Electric and Gas Company, editor-in-chief. Fabrikoid bound; 6⅝ x 4¾ in; 1,406 pages; illustrated. Second edition. Published 1931 by the National Electric Light Association, New York City. Price to members $4; to non-members $6. The latest information on the subject of protective relays together with illustrations and diagrams are included in this one volume. Text includes a description of relay functions and relay time designation symbols, details of principle types of relays, direct current system protection, alternating current protection, and a discussion of construction and application of current and potential transformers. Relay testing, setting, calibration and maintenance are thoroughly covered and the calculation of system faults is presented by comprehensive descriptions of the various methods now in use including the method of symmetrical components.

The Flowers That Bloom Before Spring

By L. C. MOORE
Agricultural Engineer, Portland General Electric Comany

WITH 100 customers and 45 kw. connected for hotbeds and soil heating, the Portland General Electric Co. finds itself pioneering in the Northwest a rural and semi-rural use of electricity with great possibilities. It is interesting to note that 20 kw. and 30 new customers have been added since Jan. 1, during a time when possibilities for new business in most lines have not been encouraging, which indicates that a high economic value to the user makes the business comparatively easy to secure. When it is understood that a large percentage of this load is added to existing lines without the necessity for a dollar of added investment on the part of the company, that each kilowatt added brings an annual revenue of $50, that monthly load factors range from 18 to 40 per cent, and that most of the use occurs off-peak, it will be recognized that this business is well worth going after.

Installations for the 100 customers referred to range from 200 watts to 6,400 watts in size. It is thought that the average of 450 watts is smaller now than it will be when the use of electricity for soil heating becomes more generally understood. The company's experience in developing this load, which dates only from February, 1931, is that many customers, somewhat skeptical at first, try it out on a small scale with a view to determining by experimentation if the use is applicable to their operations. Invariably the customers that have thus experimented have continued to use their soil heating equipment originally purchased, and in the majority of cases have materially increased their original installations. An example of this is a prominent nurseryman, who, in February, 1931, purchased a 200-watt unit on trial. He shortly added a 400-watt unit and some months later built a hotbed requiring 2 kw. of heating cable. Now, just one year after his first 200-watt installation, he is building a second 2-kw. bed so that in a short time his plant will have a total connected load of 4,600 watts, and his annual energy bill for soil heating will run over $200.

Potential Market and Use

The principal field for the development of this business, in the experience of the company, has been among the professional nurserymen and propagators of shrubs and flowers. There are hundreds such in business in and immediately surrounding Portland. They also reside and operate their businesses along many of the rural lines of the company and in and adjacent to the smaller cities served by the company in the Willamette Valley. When this group of professionals is added to the thousands of amateur gardeners in the territory, all of whom may be considered prospects for at least a small installation for propagating purposes, it will be seen that the potential market for electric hotbeds is enormous.

Another group of potential customers, which up to now has not been developed to any extent in the territory of the company, consists of the truck gardeners. It is known that electric hotbeds are particularly adaptable to starting tomatoes, celery, lettuce and mushrooms, with a view to bringing these vegetables on the market earlier than is normally possible. At the present time the company is designing a 16-kw. installation for a truck gardener who plans to start tomatoes, mushrooms and lettuce in an outdoor hotbed under glass. The use of soil heating cable in open field installations is also a possibility among truck gardeners, and several experiments in this use of electric heat are being made by various research organizations and power companies. One gardener in the Portland area is contemplating the use of 1,000 ft. of No. 14 weatherproof copper wire as the heating unit for growing celery in an open field bed. This length of wire on a 110-volt circuit will develop a load of 4½ kw.

Chief use at the present time, however, has been in shrubbery nurseries, particularly for hardy evergreens such as rhododendrons, azaleas and holly. A number of propagators of Alpine plants, some varieties of which are

On the farm of S. B. Hall, near Fairview, Ore., daffodil bulbs were carefully weighed and uniformly planted in two rows in October, 1931. One 55-ft. length of soil heating cable, 400 watts, was looped around a portion of the two rows, buried 6 in. deep near the meter pole and 8 in. deep toward the far end of the loop (nearest the camera). Heat was turned on during freezing weather in the latter part of January, 1932. Photograph (March 14, 1932) shows daffodils in bloom over that portion of the cable buried 6 in.; stalks well up and in bud over that portion buried 8 in; and stalks barely out of the ground in that portion of the bed lying beyond the cable. Soil temperature of 55 deg. is automatically maintained by thermostat. Consumption of 170 kw.-hr. in a month and a half indicates a 39 per cent load factor

By equipping his hotbeds with 2 kw. in soil heating cable, this nurseryman secures higher percentage of plants, brings rhododendrons and azaleas on the market one year earlier than formerly. Cable may be seen at far side of hotbed wall

difficult to start, also have found the use of soil heating equipment very desirable. Still another popular use has been for sweating bulbs.

Shrubbery nurserymen are using electric heat for shrubs that ordinarily were produced elsewhere, or for plants that are difficult to root, or to save time in bringing plants to a stage where they are marketable. For instance, rhododendron and azalea plants started from seed in February and transferred to outdoor beds six months later are brought onto the market one year sooner than would be possible without electric heat. It also has been found possible by the use of heated beds to root rhododendrons and azaleas from 90 per cent of the cuttings planted, when previously, with heated greenhouses, it took two years to root 40 per cent of the cuttings. A grower of Alpine plants found that under other operating conditions he formerly rooted 45 per cent of his phlox in three months' time. Now, using an electric hotbed, he roots 95 per cent in fifteen days with soil temperatures of 72 to 75 degrees.

Equipment—Design Operation

Equipment recommended by the company for use by its customers falls into two general classifications. For the small installation, a propagating tray manufactured locally is recommended. This is a sheet metal tray 30x40 in. with a nichrome wire heating element of 200 watts capacity strung open under the metal floor of the tray. This device is equipped with an adjustable thermostat and is connected by an ordinary lamp cord to any 120-volt outlet. This tray can be set on a bench or table in a greenhouse or any other enclosed space and four standard flats of seeds or cuttings can be placed on it. For larger installations, indoors or outdoors, the company has recommended some of the standard soil heating cable now being manufactured, consisting of nichrome wire wound with jute or asbestos and encased in a pliable copper or lead sheath. Such cable comes in lengths of from 55 to 65 ft., with 400 watts capacity per unit, for operation on 120 volts. The use of two lengths in series on a 240-volt circuit has been found practicable for an 800-watt installation. Installations are designed usually to provide 8 to 13 watts per square foot of hotbed, depending upon the soil temperature desired. This means that hotbeds designed to use a single length of cable are made to contain 30 to 50 sq. ft. The most common single-cable installation in and around Portland is in a bed containing 30 to 40 sq. ft.

On the subject of the proper temperatures to maintain for different operations, opinions vary. In the earliest experimental work these opinions varied as much as 15 to 20 deg. for the same class of work. Later, however, nurserymen have all scaled down their ideas on this point, and, generally speaking, lower temperatures are now used with good results. Also the temperatures used at different times of the year vary. For instance, with a 30-deg. ambient temperature, a 50-deg. soil temperature may be maintained, whereas with the ambient at 70 deg. the soil may be maintained at about 80 deg. The company invariably recommends the use of a good thermostat, many of which are available on the market. These should be imbedded in the soil and should be adjustable to operate between 45 and 90 deg., and to cut in and out so that they will hold the soil temperature within a range of 2 to 5 deg. One of the principal features of electric soil heating seems to be, in common with other uses of electricity for heat, the automatic maintenance of a practically constant temperature.

Cable is installed by looping it in parallel loops 6 to 8 in. apart across the area to be heated, and is embedded from 6 to 8 in. deep in the sand or soil of the bed. A layer of insulating material is generally placed below the bed, and for this purpose hog fuel cinders have been found satisfactory. Such an arrangement of the cable in the bed gives a fairly uniform temperature at the surface and at root depth.

On the general subject of proper temperatures to be maintained for different operations and the proper placement of cable in the bed to secure a uniform temperature

Mrs. John Minto, Clackamas, Ore., internationally known propagator of rare Alpine plants, finds the use of one length of cable, 400 watts, in a 36-sq. ft. bed in an unheated greenhouse, of inestimable value in starting some of the rare varieties so difficult to germinate by any other method

with a minimum of heat loss, it is admitted that there is much to be learned. Research organizations are studying these problems and will no doubt determine the best methods from an efficiency standpoint. But in the meantime results from installations described above have proved quite satisfactory and have been found well within the economic limit with respect to cost of installation and operation, so that the company has had no hesitancy in proceeding to develop this business along the lines outlined, using the data obtained by experience as a practical basis on which to make its recommendations to prospects.

The business has been developed by the company's rural service department with the aid of manufacturers, distributors and dealers of equipment. Most of the first

installations were made as trial or demonstration installations, for the company lacked experience to point to when attempting to interest prospects. As has been stated, however, all such original trial installations are still in operation, and the company in its sales work can now point to a number of customers who are enthusiastic about how the equipment has helped them in their businesses. Originally the company sold the equipment itself, but now it is encouraging farm equipment dealers and others to take on a line of soil heating equipment and is helping such dealers as have been established.

Operating Data

The development of the soil heating business in the company's territory has been so recent that it has not been possible as yet to secure much operating data. It has been found, however, that a 200-watt tray uses 40 to 60 kw.-hr. per month, and that a 400-watt cable runs 75 to 200 kw.-hr. per month. The reason for the variation in consumption is found in the different temperatures required in relation to the ambient temperature referred to above, and in the design and construction of beds, or the type of enclosure in which indoor beds are operated.

Professional nurserymen operate their hotbed equipment practically the year round. One nurseryman, principally raising rhododendrons and azaleas, started seeds in February and sprouted them until July. He then placed cuttings in his bed and is still running these at the present time. On Aug. 1 he installed five lengths of cable, or 2,000 watts, in a bed 6x30 ft. (See illustration.) On Dec. 31, or in the first five months the large bed was in operation, he had used in it 2,550 kw.-hr. This operation indicates a load factor of 35 per cent for the five-month period. Another customer propagating Alpine plants using three trays, or 600 watts, ran continuously for eleven months using 857 kw.-hr., indicating a load factor in this period of 18 per cent. Obviously, the monthly load factor will vary with the season, for less artificial heat will be required in the warm weather of summer. It will also vary with the capacity provided per square foot of bed and with the soil temperature required.

It will be noted in the two examples cited that the 600-watt installation of three trays is to some extent over-capacitied with 24 watts per square foot and is operated indoors, whereas the 180-sq. ft. outdoor bed with 2,000 watts in cables installed, provide a capacity of only 11 watts per square foot. A better load factor on the smaller capacity, outdoor bed would be expected. An essential point to emphasize about the operating characteristics of electrically heated hotbeds or open soil installations is that the bulk of the kilowatt-hours will be consumed by them between sundown and sunrise, with the peak use occurring in the coldest part of the night, or in the lowest valley of the average company's load curve.

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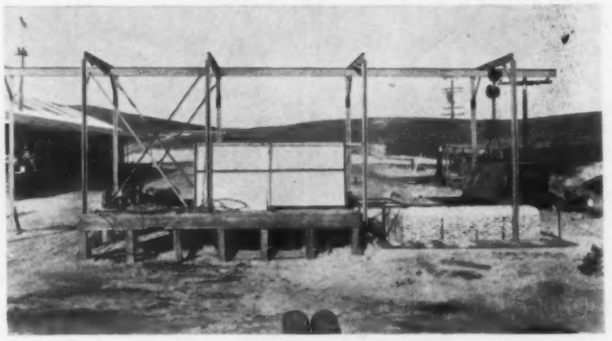
New Heating Use Found In Oil Field Operations

REMOVING the muck and grime which tenaciously clings to the equipment used in oil field operations offered a problem whose solution by the San Joaquin Light & Power Corp., Fresno, Calif., enabled the addition of 60 kw. of off-peak heating load to its lines. Inconvenience and delays resulting from the sticky and dirty accumulation of oil on machinery and tools have been incentives in the search for a rapid and economical method of cleansing oil field equipment, but, as in many past instances, electric power had to be utilized to produce the desired results.

Cooperating with the Petroleum Securities Oil Co., the representatives of the San Joaquin Light & Power Corp. suggested that some method of heating a cleansing fluid to a relatively high temperature might facilitate the cleaning process. Further investigation of this suggestion resulted in the installation of a soaking pit which consisted of a steel tank, 12 ft. long by 10 ft. wide by 8 ft. deep, sunk into a brick and concrete pit so proportioned that the top edge of the tank was 3 ft. above the ground surface. An appropriate design of the walls to provide heat insulation, and the use of sheet steel and hinged tank covers minimize radiation losses. The setting provides sufficient space around the sides of the tank to facilitate the removal and inspection of heating units. A structural steel frame supporting a small hoist mounted over the tank and adjoining platform assists in transporting and lowering the equipment into the bath.

Okite, a basic reaction fluid manufactured by the Standard Oil Co., is the cleaning fluid used in the tank, and by means of six 10-kw. immersion heating units this bath is heated to a temperature of approximately 200 deg. F. All the units are necessary to bring the tank to the required temperature which, starting from ambient temperatures, usually requires 24 hr., but when the operating range is reached, two units will maintain the temperature during normal use. Six-inch halves of steel pipe are placed over each unit as a protection from damage caused by lowering heavy pieces of equipment into the tank. By engineering the heating installation to correspond closely with the radiating characteristics of the tank, it is possible to omit temperature control devices, and the tank is usually operated during the night when the usual power equipment is shut down.

The results, obtained during the few months this installation has been in operation, have been most satisfactory to the operators, each piece of equipment so treated being clean and bright when removed from the tank. Comparatively inexpensive to install and operate, this idea is applicable to other lines of industry confronted with a similar problem, and presents still another opportunity for load-building in the desirable field of electric heating.



General view of cleansing bath for oil field machinery showing tank construction and portable hoisting mechanism. Sixty kilowatts of electric heat facilitate the cleaning of tools and equipment

A Department for the Industrial Electrical Contractor — the Motor Specialist

MOTOR FORUM

An Exchange of Ideas on Economic Electrical, Mechanical and Business Problems

Every Manufacturer His Own Distributor?

Can the Services Demanded by the Public Be Provided Economically by the Maker of Motors or Control Apparatus?

Second article in a series of studies of "The Economies of Motor Distribution" as outlined to the editors

By FRANK E. BOYD

Vice-President and Manager, Pacific Electric Motor Co., Oakland

FIRST to be given the blindfold test among the eight groups or interests listed in the first article of this series (Jan. 1, 1932, p. 28) to determine fitness to distribute motors and control economically, naturally is the maker of the motor. The manufacturer is already his own largest distributor. Why should he not do it all? What is the legitimate field of direct or indirect factory sale of his product to consumers? Can he measure up to the eight or more demands made upon him by the consumer? What would be the consequences of straight distribution?

Let us appraise the manufacturer's direct distribution in relation to the consumer tests listed in the previous article, one at a time.

First, there is the item of engineering. In this the manufacturers always seem to be in a particularly advantageous position. Especially is this true of the larger companies, whose sales engineering personnel is recruited from the bright lads of the colleges, given a thoroughly practical grounding of experience on test at the factory and then turned into the field full of late knowledge and youthful enthusiasm and the will to do deeds. Not yet high priced, these men form an economical and very dominant sales froce. No dealer can quite compete with them on shiny new knowledge and, as a rule, if he has been a dealer long, he has lost at least the bloom from his rosy enthusiasm.

Without wishing to deprecate this knowledge and the ability of these young salesmen, it is only fair to say that their chief weakness is their specialization. One of them, specializing on motors, knows a great deal more about motors than does any dealer, but he is apt to be lost when it comes to control equipment, or wiring, photoelectric cells, or any of the hundred other ramifications of knowledge needed to engineer the complete job.

Yet experience has its value too. Particularly is this true in the serving of small industrials whose finances or vision do not permit of the purchase of the latest, even if it is the best. It is because the large user of motors, such as the big steel mill, oil company, railroad, can better afford to buy in bulk, and requires all new material, that the manufacturer finds it to his advantage to sell this type of buyer direct. The selling cost is low and the competition from other manufacturers drives bulk prices down to narrow margins.

For the small industrial the more practical aspects of engineering are required. New apparatus must be combined with old; ingenuity, born from past experience, practical handyman mechanics and plain sense, is more to the point often than knowledge of new equipment.

On large-scale operations, therefore, where the bulk of the business is new equipment, the manufacturer finds himself better fitted to serve this economically himself. He should bear in mind, however, that the kind or spread of margins which govern such large-scale operations cannot be used as a guide in the determination of adequate discounts to the dealer. It would seem that this method of computing discounts has been used in the past where it had no logical place,—possibly was the only basis upon which the manufacturer had any actual cost data and hence was used to determine probable selling costs in other sales channels. Naturally this is false reasoning.

On the second count, that of "proper facilities to control and operate that equipment, including conduit and installation," some manufacturers again, because of widespread manufacturing activities, are able partially to qualify. But not all of them can. Here again a practical element enters in the form of installation labor. Properly to meet the demands of the customer on this score the manufacturer would also have to become a contractor, learn the technique of handling construction, its hazards and its peculiar problems, gain experience in the application of day labor—not shop labor by any means—to the work and take on the overhead costs of such an organization.

Here again, even where the manufacturer makes practically all of the products used in an installation, his staff is too specialized, and properly so, to spread itself out over all of the demands of an installation job. Only by specialization can large organizations be run. It is safe to say that if the manufacturer had on his staff men versed in all the departments covered in construction and installation such a man, if he had ability, would be in executive position and too valuable to use on such detail work. Thus the economy of carrying the manufacturer's organization down to and inclusive of the functions of the dealer would be open to serious financial question.

Under the circumstances, it is doubtful if the manufacturer could cut much from the costs of this type of service, shaved to the bone already to meet stringent competition.

Third point—"To be able to guarantee that when insalled the motor will be operated to conform with the necessary codes and ordinances."

This again involves getting actively in the contracting business. In no other way can the detail of obtaining permits, inspection and approval be handled, and each of these, because it takes time, increases overhead. Neither motors nor control are yet package merchandise, sold and forgotten. Each requires installation and the organization necessary to do it, and therefore should bear a portion of the overhead costs of such an organization. Daily contact with rules and regulations is the only way in which economy on this score can be produced.

In this, as in the previous point, the large industrial buyer, through his own electrical department, assumes these responsibilities as his concession toward the lower price he is granted for the apparatus.

Fourth point is emergency service, day and night. Some manufacturers have already established service shops which might possibly be expanded to offer this type of "fire department" service. This too would run up the cost of service to a point comparable with dealer costs. At the present time these service shops are few and the distances between them are great enough to make it impracticable to give this type of intimate service to the field. The advertisements of the manufacturers maintaining such shops actively solicit this type of business, and often, in order to cut down the operating overhead of such establishments, manufacturers' service men go out into the field in active competition with dealers franchised by the same company. This only demonstrates that the economies of service shops, which after all are a duplication of dealer establishments for the same purpose, are doubtful. With the right kind of dealer establishments in the field there should be no need for service shops of the manufacturer. More of this at another time.

Spare and renewal parts, a fifth point. Many manufacturers already sell many of these direct from factory branches and have learned to their own sorrow that they have done so in a majority of cases at actual loss. The cost of handling this small item business runs up very quickly because it requires so many individual transactions for the small total volume of sales. In this again, the manufacturer's service to the customer must necessarily be incomplete, because he can logically sell only his own make of repair parts, whereas the dealer, to represent the industry correctly, must carry a stock of many manufacturers' parts.

Anxious to get new motors off the production line, the entire philosophy of manufacturing is diametrically opposed to the taking on of old equipment, reconditioning it and selling it where economy dictates. Thus on this point the manufacturers are ill-equipped to render service to the consumer.

Likewise, in the rental of motors for emergencies or for seasonal operations, the same is true. This is contrary to manufacturing philosophy. Yet it is a special service often demanded by consumers. It often provides a dealer with some of the much-needed profit with which to bring up revenues lost in other motor sale transactions.

The exchange of serviceable used equipment is likewise a burden or an opportunity as the case may be, of which the manufacturer cannot avail himself.

Temporary Equipment Often Needed

These three requirements on the part of the consumer must not be belittled. After all, the fundamental interest of the electrical industry requires that the customer be made conscious of his needs for electricity and the equipment to make it work for him. A large portion of the largest and costliest class of customers to serve is of such financial stature that the best interests of the electrical industry can only be served by aiding this group to grow. This often means that an intelligent use of reconditioned second-hand equipment, even sometimes second-hand conduit and wire, will start such a customer on the road to electrification and create a potential future buyer of new equipment.

Even with large customers there are many occasions when a piece of temporary equipment is needed, sometimes for a seasonal or incidental purpose, where new equipment is not justified by the value of the work to be done. Rental service or second-hand equipment becomes a means of rendering necessary service. Again, in experimental development of processes, temporary hookups of equipment which, if the device proves desirable, later will lead to ample use of new equipment, are an opportunity for development of business which the manufacturer is not particularly well set up to experiment with and thus serve.

Such service requires knowledge and stocks of a wide range of products not made by the manufacturer of motors; for example pulleys, conveyor systems, gear assemblies, chain drives, pumps and other mechanical devices.

The "Personal" Disadvantage

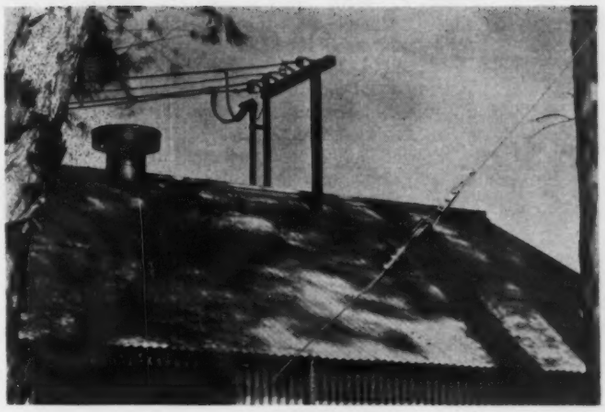
There is yet another significant point of disadvantage from which a manufacturer suffers. It is an intangible and local value, enjoyed on the large-scale operations by the manufacturer perhaps, but lost in the smaller scattered industrial centers. The customer likes to talk to and do business with the owner of the establishment. No matter how skilled, no matter how diplomatic or vested in responsibility the representative or salesman of a manufacturer may be, still he is only an employee. The head of a small industrial concern wants to do business with the head of the firm which provides his equipment. It is on this point that the smaller independent manufacturers of motors make their strong local appeal. They are the responsible heads of the company.

A world of significance lies in that relationship. It is one which the wise motor specialist very naturally fosters to his own benefit. Personal service, he calls it. Intimate service is the dealer's greatest value as a manufacturer's outlet. On it he can carry his customers over from one make of motor to another despite all the barrages of national advertising invested in the product originally.

The examples of such occurrences are so numerous as to require no further discussion on this point, for it is a situation found not only in motor distribution but in the selling of autos, airplanes or fuses. In the face of this it is strange to find manufacturers placing so much emphasis on sales promotion and advertising, as though they were magic which would make sales without salesmen. In modern salesmanship, on the other hand, we find everywhere more emphasis on the personal relationship, on the quality of contact, and the owner of the small business in a community has the best opportunity to make such contact.

In a time like the present, when, day after day, making call after call personally on my own customers and prospects fails to yield any new business, when there are no outstanding jobs, no new projects even on the horizon, it is surprising to me to see the value of a going concern, established and a part of the community. A stream of small business flows through the establishment which is sufficient to keep us operating profitably. On the other hand, the extensive sales staffs of manufacturers are, very naturally, being reduced on a basis of sales. This going concern value, solidly established in the stream of community activity, is something which the depression is revealing in its true worth.

The manufacturer's function then is to make motors. When he steps down into the sale of them he must assume immediately practically all of the sales costs, the overhead costs that are now borne for him by the dealer. There is little economy in his doing so, since the efficiency of his distribution suffers with each organizational step which, as a manufacturer, he must place between himself and the customer. What some of these costs are will be considered in a subsequent article dealing specifically with the dealer's problems of distribution.

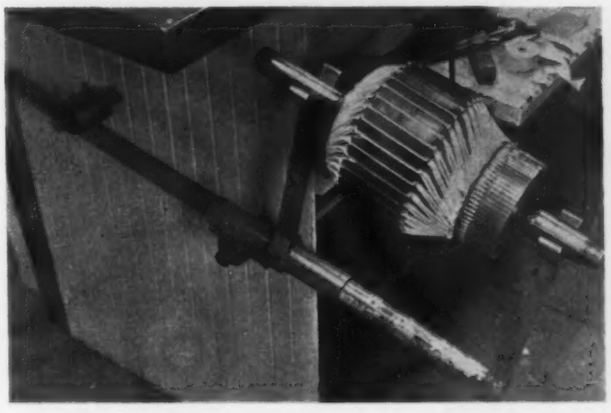


Steel Rack Service

TO terminate power company leads from the pole for connection to the service head, Backstrand Bros., Riverside, (Calif.) motor specialists, erected a staunch angle-iron frame (shown in the illustration) for its job at the Lincoln Heights Water Co. The service conduit was brought out through the sheet-iron roof. A weatherproof bushing was fitted around the service conduit at this point.

HANDY because adjustable, and because it folds out of the way at the end of a bench when not in use, is a specially devised rack on which to place small rotors during rewinding (below). It was made for the end of a work bench also by Backstrand Bros.

Adjustable Winding Rack



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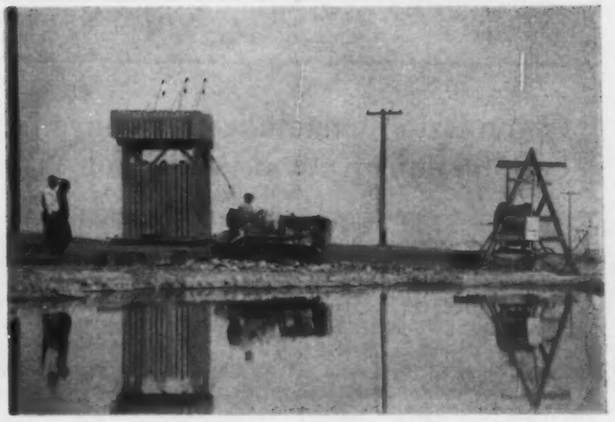
Portable Rig For Salt Farm

TO harvest a long-standing salt deposit in one of the settling areas of the Alviso Salt Co., at Alviso, Calif., an elaborate conveyor system is employed. In order to make this equipment portable enough to move from one settling basin to another, and still run the conveyors electrically, an ingenious system of portable service has been devised by the engineers of the company. A transformer bank has been mounted on a sled, housed in for protection. Flexible leads tap off from this movable substation to another sled and wind on a large reel of cable. This latter sled is equipped with a switch can and leads to attach to the conveyor supply connections. A three-wire primary pole line



traverses the salt farm at intervals. The transformer sled is moved under the line at the nearest convenient point. Leads are provided to connect the primary side of the transformers to the pole line circuit. A tractor is used to move the equipment from place to place.

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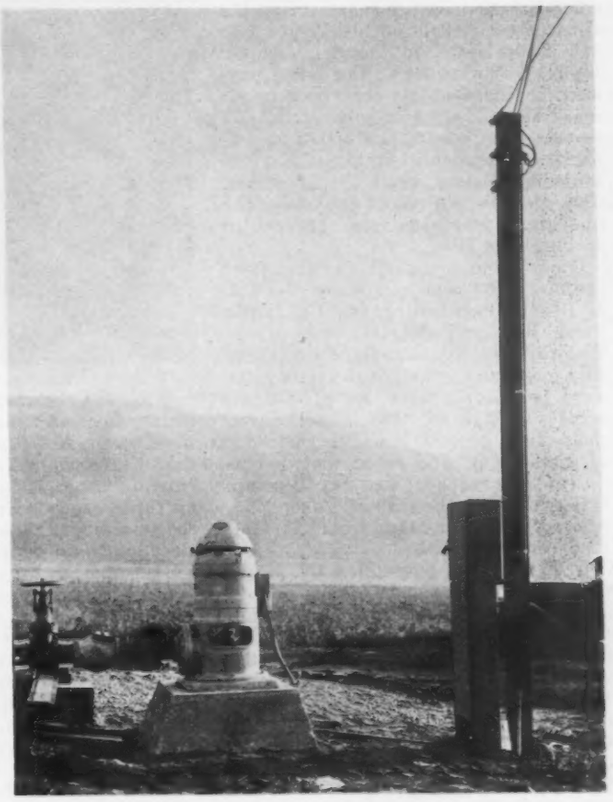
Reduced to A Minimum

OUTDOOR substations and generating plants have nothing on some of the pumping plant installations made by J. L. Mitchell, Oxnard (Calif.) Electragist. Mr. Mitchell makes up a combination switching, control, meter and fuse panel in a metal weatherproof case in his own shops. This, mounted alongside a short post to which power company leads are brought to a service head, with a driven ground adjacent, is connected, by conduit run for a short distance underground, to the vertical motor-driven pump, built for outdoor operation.



Commission Concludes Hearings in San Joaquin Rate Investigation

ESTIMATES for going concern value presented a major obstacle to the determination of a proper rate base in the hearings last month before the California Railroad Commission in the investigation of rates charged by the San Joaquin Light & Power Corp., and its subsidiary, Midland Counties Public Service Corp.

In rate base figures there is not a great difference between estimates of the power companies and the commission. The commission engineers contend that $69,000,000 is a proper rate base for the San Joaquin Light & Power Corp., while the power company places $69,692,467 plus an allowance for working capital and $7,500,000 for going concern value as its estimate of the proper rate base. The commission's staff has set $6,200,000 as the rate base for the Midland Counties company, and the power companies have set $6,010,363 with $600,000 for going concern value.

In his argument before the commission, sitting *en banc* March 19, W. W. Cooper, director of research for the Railroad Commission, strongly recommended against allowing going concern value in the rate bases of the two power companies. Mr. Cooper also recommended the elimination from operating expense of a $3,000 monthly administration charge representing the services of officials of the Pacific Gas and Electric Co. to the San Joaquin Light & Power Corp., the large payment to chambers of commerce boosters' clubs and dues to commercial and private clubs, the $200,000 cost of preparing a complete inventory of the San Joaquin company, begun in December, 1930, the $18,000 cost of publishing the company's magazine, and $20,000 in uncollectable bills.

Others who appeared in argument against the power companies were J. J. Deuel, representing the California Farm Bureau Federation, who stated that farmers would replace electricity with diesel and gas engines unless rates were lowered; Claude Rowe, city attorney of Fresno, who attacked the companies' depreciation fund as "out of proportion," and asked that domestic rates be reduced; and Jay Hinman, rate expert for the City of Bakersfield, who sought lower rates from the Midland company.

C. P. Cutten, representing the power companies, devoted much of his time to attacking the estimates for depreciation allowances made by the Railroad Commission's staff. He also defended the estimate of the company's engineers of $1,122,762 as a proper contribution toward the "tie-in" line connecting the Great Western Power Co. with that of the San Joaquin Light & Power Corp. The Railroad Commission's staff had placed $604,650 as a proper figure for this item. Senator Cutten declared that the arrangement at the figure fixed by the company was cheaper for San Joaquin users than if the company had been forced to erect steam standby plants to provide excess power needed, or had been forced to buy such power in the open market. Senator Cutten also attacked estimates of a higher revenue in 1932 from agricultural power sales than had been received in 1931. Revenue from this source he states was 14.4 per cent lower for January and February of 1932 than for similar months in 1931. Revenue for other electric uses, he stated was 10.6 per cent lower for the same two months of 1932 than in 1931.

With oral arguments concluded on March 21, the commission has announced that a further hearing will be held April 6 in Fresno on the specific question of the spread of rates. The commission has formally suggested a total reduction in gross revenue of $650,000 on a year of average conditions and has notified each of the parties concerned to submit recommendations as to adjustments in the various rates of the company to accomplish this total saving to consumers.

Discovery of errors totaling $8,000,000 during this rate investigation has resulted in a reorganization of the commission's valuation department. Effective April 1, John E. Cooper, for ten years a member of the Railroad Commission's staff, will become valuation engineer, succeeding Paul E. Dufour, who has been assigned to the general staff as assistant engineer. Five unnamed members of the valuation department staff have been dismissed. All the changes were made "for the good of the service," according to the commission's announcement.

Agitation for lower electrical rates in the agricultural territory served by the San Joaquin Light & Power Corp. has been prevalent for more than a year. Upon complaint of the California Farm Bureau Federation and other bodies, the California Railroad Commission on April 8, 1931, ordered a 20 per cent reduction in agricultural power rates to apply from May 1 to August 31. Claude Rowe, city attorney of Fresno, objected to the *ad interim* rates on the grounds that customers in his city had been discriminated against in favor of the agricultural interests of the territory.

San Francisco Lights Its Boulevards

With the completion of the lighting installations on Bayshore Blvd. and the Nineteenth Ave. boulevard extension, San Francisco will have model boulevard lighting installations. On both of these roads new types of General Electric 20-ft., single-standard luminaires of "San Francisco" design are used. The units, employing 10,000-lumen lamps, are spaced approximately 125 ft. apart and are opposite each other.

The Bayshore Boulevard units are mounted on ornamental cast-iron standards; those on the Nineteenth Ave. boulevard extension, shown above, are supported by concrete standards. In all, 1,000 standards will be installed on these two thoroughfares.

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J. F. Dore Elected Mayor of Seattle

With a majority of 31,000, the largest ever voted to a mayor in Seattle, John F. Dore was elected mayor of that city March 8, and the citizens are prepared for drastic changes in the city government. Three new councilmen elected are friendly to Mr. Dore, and give him control of the city council. The mayor-elect is a supporter of City Light, and it is believed will further its development during his term of office. The office of superintendent of utilities was abolished by the passage of charter amendment No. 5. Two other amendments, one creating a street railway commission and another providing for a street railway manager were defeated.

Mr. Dore immediately instituted a suit to remove the present mayor, Robert Harlin, from office, declaring that Mr. Harlin was appointed by the council merely to fill the vacancy when Frank Edwards was recalled last year, and that the vacancy ended in the election in which the people expressed their own choice for the office. The ouster proceedings were thrown out of the Seattle court, but Mr. Dore has

announced his intention of carrying the suit to the supreme court.

Immediately upon being assured of his election, the mayor-elect repeated his promises, which were the key-note of his campaign speeches, to offer the Stone & Webster interests $1,000,000 in full and final settlement of the street railway purchase contract with the Puget Sound Power & Light Co., and if that is refused, to "throw the system into a receivership and buy it back as junk."

Unless Mr. Dore is able to persuade the city council to negate the street railway purchase contract, H. L. Collier, city treasurer, states that, in order to meet a bond interest payment to the Puget Sound Power & Light Co. in September, it will be necessary for him to begin impounding current revenues Aug. 1, issuing warrants for salaries and current expenses. The total amount due the light company for interest and principal redemption is $8,036,000. It has not been explained how the city would obtain the $1,000,000 necessary to carry out the settlement with Stone & Webster if such an arrangement should prove agreeable to the power company.

Meanwhile, the city council has taken steps to direct the street railway until Mr. Dore takes office. The council's public safety committee is drafting a bill to transfer control of the railway to the Engineering Department until the new mayor moves in. A. E. Pierce, acting superintendent of public utilities, declares that the charter amendment abolishing the post of superintendent of public utilities does not effect his duties as assistant superintendent of public utilities in charge of the street railway. He points out that his title may have to be changed, since the superintendency to which it is assistant has been eliminated.

Among the campaign promises which Mr. Dore immediately reaffirmed upon his election, are slashes in salaries in excess of $3,000, including reduction of his own salary from 7,500 to $5,250, and that of J. D. Ross, superintendent of lighting, from $7,500 to $5,000. Similar reductions will be made throughout the city hall departments, according to Mr. Dore, with elimination of numerous official positions.

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Weadock New N.E.L.A. Managing Director

Bernard F. Weadock, for years special counsel for the utilities in the Federal Trade Commission investigation authorized by the Senate on Feb. 15, 1928, has been appointed managing director of the National Electric Light Assn., according to word received from New York as this issue goes to press. Mr. Weadock, an attorney with wide utility experience, succeeds to the position left vacant when Paul Clapp resigned to accept an executive position with the Columbia Gas and Electric Co.

The new association head is well known in the West and those who attended the N.E.L.A.-P.C.E.A. combined convention in June, 1930, will remember his vigorous address, attacking what he designated as an "Unholy Alliance" of various organizations dominated by the National Socialist Party. (ELECTRICAL WEST, July 1, 1930, p. 30.)

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Off-Peak Water Heating Rate Set by Edison Co.

Three off-peak water heating rate schedules went into effect March 26 on the lines of the Southern California Edison Co. Ltd., applicable to residences where an electric range is installed. The Edison company is now the second on the Pacific Coast to offer this service (ELECTRICAL WEST, Oct. 1, 1931, p. 179).

Applicable to the company's entire territory except the San Gabriel and San Bernardino Mt. areas, the first schedule fixes a rate of 1 c. per kilowatt-hour for the first 7 kw.-hr. per month per gallon of tank capacity. All excess kilowatt-hours are at 1½ c., with a minimum charge of $3 per month.

For the two mountain areas, the first 7 kw.-hr. are charged at a 1¼-c. rate, the remainder at 1¾ c., with the same minimum charge.

Special conditions, alike throughout the system, are set up and include: Storage type heaters must be used; heaters limited to a two-unit type with accelerator tube; lower element not to exceed 25 watts per gallon, upper element not to exceed 50 watts per gallon, each element individually controlled by an adjustable thermostat; total kilowatt rating of water heater shall not exceed 50 per cent of range rating plus 25 per cent of all other utilization equipment rated at more than 1 kw.

H. C. Rice, merchandising department manager, estimates that 25,000 customers qualify for this rate and has begun a campaign directed at these. Direct mail will be used and each prospect will be contacted by a salesman; the list probably will be covered by June 1 and the conservative quota of 420 units oversold.

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Oil Conservation Law Up to Voters in May

A special election in San Francisco has been called for May 3, coincident with the presidential primary election, in order that the opinion of voters may be obtained on the Sharkey oil conservation law. This act, designed to curtail wasteful production, was passed by the last legislature and signed by Governor Rolph. A small group of producers, according to C. R. Stevens, of the California Oil and Gas Assn., blocked operation of the law by invoking the referendum.

The conservation law sets up an Oil Conservation Commission with authority to prorate production among the several fields. The state oil and gas supervisor is made a member of the commission, and all of its acts and orders are subject to approval or rejection by the State Department of Natural Resources.

Hood River Citizens File Public Utility Petitions

Petitions representing the wishes of a few citizens in the city of Hood River and Hood River County, respectively, to have a survey made as to the advisability of creating a people's public utility district to be known and designated as the "Hood River People's Utility District," have been filed with the Oregon State Hydro-electric Commission. The petitions contain the information that the population to be served by the proposed electric power project totals 8,000 people, and the territory involved has an assessed valuation of $10,000,000. The estimated cost of the development is placed at $850,000, which includes $590,000 for plant construction and $260,000 for transmission and distribution systems. Horsepower to be developed, assert the petitions, amounts to 2,500, and the source of water power supply is the west fork of Hood River. Preliminary operations will call for a main transmission line 12 miles in length.

The district is now extensively served by the Pacific Power & Light Co., Portland, and is one of the localities in which the earliest experiments with rural lines for farm service on the Pacific Coast were tried out. Rural line construction began in the Hood River Valley in 1906.

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G. E. Emergency Relief Plan to Continue

Although the guarantee of employment or equivalent pay for apparatus works' employees of the General Electric Co. will terminate on April 30, in accordance with the plan announced Oct. 1, 1931 (see ELECTRICAL WEST, Nov. 1, 1931, p. 251), the emergency clause of the unemployment insurance plan will continue and every effort will be made to spread the available work as far as possible, and to grant relief to those for whom little or no work is available, President Gerard Swope has declared.

"Employees after May 1 not earning 50 per cent of normal pay, up to $15 per week, will be eligible for such relief as authorized by the board of administrators after reviewing the needs in each case," President Swope explained. "This money will be taken from funds collected by the one per cent deduction from pay of all employees receiving 50 per cent or more of regular pay and the company's contribution, which will continue in force after May 1.

"Since the unemployment emergency was first declared on Dec. 1, 1930, payments have been made at various times to 19,673 different employees. Payments from this fund to Feb. 29, 1932, totaled $1,724,000. One-half of this money was contributed by the employees earning 50 per cent or more of their normal wages and one-half by the General Electric Co."

Contracts Awarded for Colorado Hydro Plant

Recent contract awards to successful bidders bring construction plans on the Reclamation Service—Public Service Co. of Colorado 3,000-kw. hydro-electric plant at Palisade, Colo., nearer to consummation.

The U. S. Reclamation Service, which is supervising the project, approved these contracts on machinery and equipment: two 2,300-hp. turbines and governors, to be supplied by the Pelton Water Wheel Co.; two 1,875-kva. generators, Electrical Machinery Mfg. Co., Minneapolis; switchboard, Standard Mfg. Co., Dallas, Texas. Total cost of this equipment was $72,000.

About $15,000 has been spent improving the main canal of the Grand Valley Water Users' Assn., which will handle irrigation water to be pumped by the new station; and considerable work on the plant forebay is being done as weather permits.

The Palisade project is a joint undertaking in which the government, the Grand Valley Water Users' Assn. and Public Service Co. participate. Public Service Co. is financing construction, will operate the plant for 25 years, then relinquish it to the government for the benefit of the Water Users' Assn.

Within the next 60 days the Reclamation Service office in Denver will ask for bids on construction of the building, which will probably involve about $128,000. The entire job, including installation of machinery, will cost approximately $215,000.

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Ideal Hen-House to Be All-Electric Home

Electric light for hen-houses, electric brooding and electric warming of drinking water for hens are provided for in the specifications for the ideal hen-house designed by the Oregon State College for a poultry project being developed near Scappoose, Ore. In this town, twenty miles west of Portland, a unique industry development program is under way. A banker, a landowner, three railroads, two chambers of commerce, a lumber company and others are sponsoring the development of a poultry industry here through the offer of gifts to the first twenty settlers qualifying for the project. Among the sponsors is Portland General Electric Co., which serves that general area, and which has agreed to run the distribution lines in the tract and hook up each farm without cost.

Each applicant accepted for the project receives a gift of three acres of land and an option for a year on an adjoining three acres at $125 per acre. The land is donated by Daniel E. Freeman, pioneer farmer of that vicinity. In addition the settler receives special prices on lumber and other building supplies from the West Oregon Lumber Co. and receives other gifts from miscellaneous sources having a total value of $1,600. Each settler must have $4,000 of available capital and agree to buy 1,500 of the best stock of Leghorn baby chicks. Through cooperative hiring of a trained supervisor during the brooding and laying season, cooperative buying of feed and supplies, and cooperative shipping of the product in carload lots, it is expected that many operating savings will be effected.

The project was concieved by E. E. Wist, president of the First National Bank of Scappoose, and thus far ten of the twenty families contemplated for the initial unit of the project have been placed.

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Los Angeles Power Bonds Not May Election Issue

Decision not to place a proposed $34,400,000 power bond issue proposal on the ballot for the May 3 election was reached Mar. 14 by the Los Angeles city council, which rescinded former instructions proposing the issue. The matter of conducting the bond election was returned to the council's water and power committee, which will confer with the water and power commission on another date, possibly that of the general election in November.

It was felt by the council that the time remaining was too short to conduct a successful campaign. The $34,400,000 issue, if voted, was to go toward the construction of a transmission line to Hoover Dam, construction of a steam generating plant at Wilmington and extensions and betterments to the lines of the bureau of power and light.

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136 ENROLLED FOR SEATTLE LIGHTING SCHOOL—With five sessions completed, and four more scheduled to be held, enrollment in the lighting school being conducted in the Smith Tower, Seattle, under the auspices of the Electric Club of Seattle, has reached a total of 136, according to the report of George Boyd, chairman of the arrangements committee. The first sessions were devoted to the study of light sources, their character, quality and sizes and how they may and should be used to the best advantage. The lessons were fundamental, laying the groundwork for practical application. The remainder of the sessions will be devoted to the practical applications of our present light sources to the art of seeing and decorating, and will involve such problems as factory, store, office and home lighting. The farm lighting problem also will be discussed. The initial sessions were addressed by N. R. O'Farrell of the Edison Lamp Works; George Boyd of the Westinghouse Electric & Mfg. Co.; Lyman D. Morgan of the Pittsburgh Reflector Co., and others.

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Southern California Has State's Highest Stream Bed Precipitation

DEPTH and water content of snow at California's key snow courses in the latter part of February were from two to four times greater than last year, according to the monthly bulletin of *Snow Survey and Precipitation Data* compiled by the California Division of Water Resources. The following table shows the comparison between this and last season's snow by stream basins:

Stream Basin	Times water content of snow exceeds 1931 water content		
	Number of courses	Average	Range
Upper Sacramento			
Pit and McCloud	2	1.5	1.4 to 1.7
Feather	4	6.8*	1.7 to 10.8*
Yuba	5	3.3	2.2 to 6.7
American	4	2.7	2.2 to 3.2
Mokelumne	2	3.6	2.9 to 4.4
Stanislaus	4	4.4	3.8 to 5.8
Tuolumne	6	3.6	2.6 to 5.8
Merced	6	2.9	2.6 to 3.4
Upper San Joaquin	3	3.8	3.3 to 4.2
Kings	1	5.6	
Kaweah	3	3.0	2.7 to 3.3
Kern	1	2.4	
Truckee	1	2.2	
Carson	2	3.0	2.9 to 3.2
Mono	2	4.3	3.1 to 5.5
Owens			
Upper	4	4.1	3.8 to 4.6
Rock Creek	3	7.0	6.0 to 8.4
Bishop Creek	2	5.0	4.7 to 5.3
Big Pine Creek	3	10.5	9.1 to 12.8
Cottonwood Creek	2	5.0	4.3 to 5.6

*Greatest depths for any courses in the state reported for Bucks Lake vicinity. Distribution of the four courses too limited to be representative of entire Feather Basin.

Data from the precipitation stations show, in general, a progressive increase in the percentages of normal to March 1 in going from the northern to the southern stream basins, thus: The average precipitation up to March 1 was from 10 to 15 per cent below normal in the Upper Sacramento, Pit, McCloud and Feather River basins; from 5 to 10 per cent above normal in the basins from Yuma to Stanislaus; about 30 per cent above normal in the Tuolumne and Merced basins; from 45 to 50 per cent, or better, above normal from Upper San Joaquin to Kern basin; and from 60 to 90 per cent, with a general average of about 75 per cent above normal in the Los Angeles, San Gabriel and Santa Ana basins.

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RETAIL DISTRIBUTION FIGURES PUBLISHED—Information on the retail activity in every county and city in the United States of over 10,000 inhabitants has been made available by the Census Bureau in Washington through a 130-page publication entitled "Retail Distribution in the United States by Counties and Cities." Figures show retail distribution classified by principal business groups and selected kinds of business. Copies of the booklet may be obtained free, as long as they last, by addressing the Census Bureau, Washington, D.C.

Seattle Lawyer Criticizes City Light Land Purchase

Criticism of the mixed system by which transmission line right of way for the Seattle City Light Department has been acquired—part of it by private purchase and part by condemnation proceedings—was sent to the city council recently by Corporation Counsel A. C. Van Soelen, who declared that land acquired in this manner, especially within the city limits, has cost the department more than it should. He also said it had handicapped his department and the city in the recent trial of right-of-way condemnation suits involving jury awards of $113,115, the attorney said.

Mr. Van Soelen and his assistant, W. D. Covington, recommended the adoption of adherence to a fixed method of getting City Light land in the future. Right-of-way for City Light's projected Skagit transmission line No. 2 has cost the city approximately $1,000,000 the records indicate.

In their letter to the council, the attorneys state that in their belief if all the right-of-way, particularly within the city, had been acquired by condemnation instead of purchase, a considerable saving could have been effected. "The theory that acquisition by purchase," the letter states, "saves time, is, in our judgment, fallacious, as hold-outs are inevitable, necessitating some final condemnation in any event."

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Sale of Truckee, Calif., Electric System O.K.'d

Sale of the properties of the Truckee (Calif.) Electric Light & Power Co. to Sierra Pacific Power Co. for $20,000 has been approved by the California Railroad Commission. The sale includes about 20 acres of land along the Truckee River at the eastern edge of the town of Truckee, Calif., together with a dam and small power house owned by Paul M. Doyle, who owns nearly all of the stock of the Truckee Electric Light & Power Co.

Granting of the application by the commission was opposed by Truckee Public Utility District, which built an electric distributing system in 1928 and since then has been operating in competition with the Truckee Electric Light & Power Co. The district contended that the competing company had no franchise and no right to operate a utility business in Truckee, and therefore had no property of any value to convey; that the Sierra Pacific Power Co. likewise had no valid franchise to serve the town; that the sale price was excessive; and that public convenience and necessity did not require the transfer. The Railroad Commission found that through its service of the town of Truckee with electricity since 1890 the power company had acquired a valuable property right, and that such a right is transferable.

Application by Truckee Public Utility District for a rehearing has been denied by the commission.

X-Ray Transformer

HIGH-VOLTAGE transformers for X-ray work differ in appearance from transformers for other work. The one illustrated is one of two intended for operation of the Lauritsen X-ray tube for cancer research in the Kellogg Radiological Laboratory of California Institute of Technology, and was built at the Pittsfield plant of the General Electric Co. Each has a rated capacity of 0.03 amp. at 700,000 volts effective to ground continuously. They are intended for operation in series with neutral grounded, giving 1,400,000 volts effective, or 2,000,000 crest volts, at the X-ray tube. This is sufficient to produce X-rays at a frequency and penetration comparable to those from radium. The transformers are believed to be much smaller for the voltage than anything heretofore built.

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Tests Show Hogged Fuel Storage Possibilities

Green sawdust for heating purposes may be stored under cover for periods up to one year with so little loss in heating value as to make storage quite feasible and practical. On the other hand, open storage of sawdust for two years or more is not practicable. Even one winter in the open results in such increase of moisture content as to reduce heat value materially.

Such are the findings from a protracted study of B.C. sawdusts conducted in the Canadian Forest Products Laboratory at University of B.C., Vancouver, results of which have been published in a report from the Forest Service, Department of Interior, Ottawa.

Douglas fir sawdust is the most satisfactory of the species available from coast lumber mills. High moisture content of Western hemlock greatly reduces its heating value, while the high heat value of Western red cedar is more than offset by the small weight of material per unit.

Organize Vancouver Residential Contractors

Marked improvement not only in relations between the contractors themselves but in their assistance to the Red Seal wiring plan has been felt in Vancouver, B. C., since the organization of the residential electrical contractors of that city with R. Hall, acting secretary of the Electrical Service League of British Columbia, acting as secretary of the contractors' association, an annual report of the league reveals.

Conditions among residential contractors were so accute during the early part of 1931 that, despite repeated attempts to form associations of this group, a new attempt was made by Mr. Hall. In August the first meeting was called. Twenty-five of the 46 contractors of this class responded. At a second meeting held in September the league acting secretary was asked to act as secretary of the association. The arrangement has proved very satisfactory, the spirit has improved and the league's program of adequate wiring has been given hearty support, whereas previously it had met resistance. In the year-end report it was announced that a total of 3,629 Red Seal certificates have been issued by the league, each calling for range wiring.

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Wage Reductions Taken In Two Cities

Salt Lake union electrical workers accepted a reduced wage schedule after conference with electrical contractors of that city, it was announced by T. R. Faddis, business agent for local No. 354, I.B.E.W. The reductions range from 20 per cent downward, according to class of work, the hourly rate being brought down to $1. The reduction is in effect for 1932 contracts.

Sacramento building crafts generally accepted a voluntary wage cut ranging from 9 to 20 per cent, effective Mar. 7. Electrical workers' wages were cut from $10 a day to $8.50. The rule is to be operative for one year. A five-day week of eight hours per day is likewise in effect, having become effective June 2, 1930.

Similar action is in contemplation in a number of cities in the West.

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HEARING TO BE HELD ON FLATHEAD PROJECT TIME EXTENSION—A public hearing will be held by the Federal Power Commission at Polson, Mont., April 7 to consider an application for an amendment to the license of the Rocky Mountain Power Co. covering its project at the outlet of Flathead Lake. Commissioner Claude L. Draper will preside at the hearing. The proposed amendment would extend the time for completing the project for one year until May 23, 1935.

Potter Valley Power House to Be Rebuilt

Plans for the reconstruction of its Potter Valley power house about fifteen miles northeast of Ukiah, Calif., have been announced by the Pacific Gas and Electric Co. Plans call for installation of an 8,500-hp. hydraulic turbine and a new generator to replace two 2,500-hp. generators designed 23 years ago, and the rearrangement of the interior layout to include new circuit breakers, switchboards and related equipment. Two new 2,000-kw. transformers are to be added. At present the plant is equipped with four electric generators and has an installed capacity of 12,750 hp. Installation of modern equipment will bring the installed capacity up to 16,750 hp. With the same volume of water passing through the new generating equipment, efficiency of the plant will be increased from 46 to 86 per cent.

Potter Valley power house was acquired by P. G. and E. from the Snow Mountain Power Co. in November, 1929.

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Hearing on P. G. and E. Rates Postponed

Hearing on the rate cases instituted by the City and County of San Francisco, and the cities of Oakland, Berkeley and Piedmont against the Pacific Gas and Electric Co. and the Great Western Power Co. has been postponed until April 20. The hearing was originally set for March 15. Consolidated with these cases are investigations ordered by the commission on its own motion into the electric rates of these companies.

The postponement was occasioned by inability of the Great Western Power Co. to complete the compilation of certain data requested by the complainants as a part of the cases instituted by them.

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B. C. Transmission Lines Damaged by Floods

Serious floods in February in the Fraser River valley of British Columbia resulted in trouble to the B.C. Electric Railway Co.'s transmission lines supplying power from the Stave-Ruskin generating group to Vancouver, and washed out a 1,300-ft. section of track on the company's interurban line in the same district.

On Feb. 26 two successive washouts occurred. The first brought down the 60,000-volt transmission line which ties Stave Falls and Ruskin power plants. At the same time part of the Stave Falls electric railway was washed out. Circuit breakers in the two plants came into action, isolating the line and causing surges throughout the system.

A second washout some two hours later carried away part of the 60,000-volt transmission line between the Alouette automatic power plant and Stave Falls. This caused isolation of the Stave Falls plant. The power load was carried for a short time by the Lake Buntzen and Ruskin plants. This second washout resulted in a six-minute stoppage of street cars in Vancouver.

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H. A. Van Norman Honored For 25 Years' Service

HONORED on the completion of 25 years of public service, H. A. Van Norman, general manager and chief engineer of the Los Angeles Department of Water and Power, was presented with a 25-year service pin at a recent meeting of the board of water

H. A. VAN NORMAN

and power commissioners. With scores of fellow employees in attendance at the meeting, Arthur Strasburger, president of the board, pinned the emblem on Mr. Van Norman and recounted briefly his service with the department.

"Tomorrow you will complete the work of a quarter of a century for the city of Los Angeles, work that has been performed in a faithful and efficient manner," Mr. Strasburger said. "During this period you have been intrusted with responsibilities for projects that contributed greatly to the life and progress of our city. Your supervision of these projects was carried on in an orderly, quiet, painstaking manner with only one object in mind—to get results—results that were lasting, results that meant quality, at a cost that eliminated waste."

Mr. Van Norman's first work was the building of the Figueroa, Slauson and headworks pumping plants. For ten years he was in charge of maintenance and operation of the Owens River aqueduct. In May, 1923, he was given a leave of absence at the request of the Board of Public Works to design and build the north outfall sewer. In recognition of his accomplishment he was made city engineer. He was recalled to the department after serving one year in this capacity, and was made assistant to William Mulholland, his chief for sixteen years. He was appointed chief engineer and general manager of the water system in 1928, a short time later becoming general manager and chief engineer of the entire department.

Tacoma Voters Ban 25-Year Power Sale Contracts

Tacoma voters at an election March 8 defeated, by a vote of 8,231 against and 5,171 for, a charter amendment which would have enabled the public utilities department to contract for the sale of power and water with industries for 25 years instead of 10 years. The amendment was proposed by the city council to enable the Tacoma municipal public utilities department to contract for the sale of power and water for a longer period than ten years, the supporters of the amendment declaring it is necessary to enable Tacoma to bid for new industries on an equality with Seattle and Portland, where public or private power systems are enabled to contract for a period of 25 years.

The amendment was fought in some circles as a dangerous measure which would allow a city council hostile to municipal ownership to tie the city up for 25 years to a losing contract, it was asserted.

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EL PASO EMPLOYEES OFFERED GARDEN TRACTS—El Paso Electric Co. officials have adopted a practical method for aiding its employees through the depression. At the Rio Grande power station site the company has available about 35 acres of tillable land not being used. This land is being offered in small blocks to employees in all departments of the company, to be used for planting gardens. The land, in acre and half-acre tracts, may be procured rent free by any company employee in the order in which it is applied for. Those taking advantage of this offer will be able to raise enough garden truck for use of their families without other cost than the expense connected with tilling the land and planting the crop.

GRAND FORKS, B.C., BUILDING CITY POWER PLANT—Work has now been commenced by Yuill & Knight, electrical engineers, Vancouver, on the erection of a new municipal power plant at Grand Forks, B. C., to cost approximately $45,000. Rate payers recently approved a by-law authorizing the expenditure of this sum. The builders are A. C. R. Yuill of Vancouver, and Captain J. G. Knight, of New Westminster, B.C. The Canadian Westinghouse Co. will manufacture and supply the machinery. The plant, which is to be installed in a brick power house to be located about 250 ft. below the lake dam, will consist of two twin units, each with a capacity of approximately 230 hp.

HOPKINS ELECTRIC APPLIANCE CO., LTD., specializing in specialty sales of refrigerators, ranges, air and water heaters, recently moved to a bigger display room at 1816 Franklin St., Oakland. H. C. Hopkins, proprietor, was formerly range supervisor for the P. G. and E. Co. at Oakland.

Turlock's Power Supply Agreement Approved

An agreement between the Turlock (Calif.) Irrigation District and the San Joaquin Light & Power Corp. providing for the sale by the district to the power company of surplus electric power manufactured at the Don Pedro and La Grange power plants has been approved by the California Railroad Commission. In turn, the power company is authorized to sell to the district as much electric energy as it may require up to 5,000 kw. each year from June 1 to Dec. 31 should the stored water in the Don Pedro reservoir be depleted during that period.

In a separate order Turlock Irrigation District is authorized to purchase and Sierra and San Francisco Power Co. and Pacific Gas and Electric Co. to sell the Hickman substation, a portion of the Don Pedro-Modesto transmission line, all electric transmission lines of the Sierra and San Francisco Power Co. operated at less than 20,000 volts, and certain described telephone lines and equipment. Turlock agrees to pay the Sierra and San Francisco Power Co. $170,000, either in cash or electric energy for this property. P. G. and E. Co. is joined in the application as lessee of the property of the Sierra and San Francisco Power Company.

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Bill Delivery Keeps Employees at Work

Employees of the Southern California Edison Co. who might otherwise have to be laid off for lack of work have been kept busy in recent months by being used as private carriers for the company's bills. An envelope stuffer bearing the following message has received much favorable comment from Edison domestic customers:

This bill was delivered by private carrier as a measure of extra employment. The Edison Company, like many others in recent months, has not had enough work for its employees. Rather than lay them off, various plans have been devised to furnish work of some sort, and a number of them are kept busy distributing bills which formerly were sent out by mail. We believe the public will understand and endorse the plan.

Southern California Edison Company Ltd.

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LELAND & HALEY, San Francisco electrical and mechanical consulting engineers, recently finished the plans for three of the new government buildings to be built soon in Washington, D. C. These include the Interstate Commerce building, the meeting hall and the Department of Labor building. The plans include the electrical, mechanical, plumbing and heating and air conditioning systems in these structures.

FIFTH MEMBER APPOINTED TO L. A. WATER & POWER BOARD—After rejecting four nominations by Mayor John John C. Porter to the Los Angeles Board of Water and Power Commissioners over the course of eight months, the city council on March 14 unanimously confirmed the appointment of John W. Baumgartner, Los Angeles civil engineer, as a successor to O. T. Johnson, Jr., resigned. Confirmation of the appointment of Mr. Baumgartner breaks a deadlock existing between the four members of the board since the resignation of Mr. Johnson last summer.

COAST COUNTIES GAS AND ELECTRIC Co., Santa Cruz, Calif., has announced the following additions to its personnel: assistant auditor, W. J. Neider, formerly with the Natural Gas Properties of Oregon; in the land department, Carl Hoerr, formerly in charge of right-of-way for the Standard Management and Operating Corp.; in charge of stores and purchasing department, P. Schaefer, formerly with the Natural Gas Properties of California.

SEEKS HYDRO PERMIT IN LEWIS COUNTY, WASH.—Sherman Coombs, of Olympia, Wash., has applied to the state division of hydraulics for permit to supply the town of Packwood in Lewis County with water for power and municipal development. The project is estimated to cost $30,000 and involve 9.5 sec.ft. of water from Snyder Creek, tributary of the Cowlitz River.

SEEK TO REPLACE TACOMA COMMISSIONER—Aspirants for the post of commissioner of public utilities in Tacoma, seeking to replace Ira S. Davisson, who has held the post for twelve years, declare that an increase in Tacoma power rates is assured if the present policy of the department is maintained. Charles E. Davidson, who seeks the post, pointed to an extract from an ordinance passed last December which promised an increase in power rates if the revenues of the department were not sufficient to pay the warrants on the recent $500,000 loan made to the public utilities department. Davisson declares there will be no increase in rates.

CHANGES IN COLORADO LEAGUE'S EXECUTIVE STAFF—L. M. Cargo, president of the Electrical League of Colorado, has announced the following changes in the staff personnel of the league: John J. Cooper has been appointed executive manager to succeed George Bakewell, Jr. Mr. Bakewell will continue on the staff as assistant to Mr. Cooper and will assume the duties of field representative. John A. Baker, former field representative, resigned March 1.

TACOMA MUNICIPAL LIGHT DEPARTMENT'S new $2,000,000 steam plant is now ready to be given its boiler, generating machinery and other tests, for many months held up because of the defective concrete in the condenser intake, which has been repaired. The plant has a turbo-generator set of 25,000-kw. capacity.

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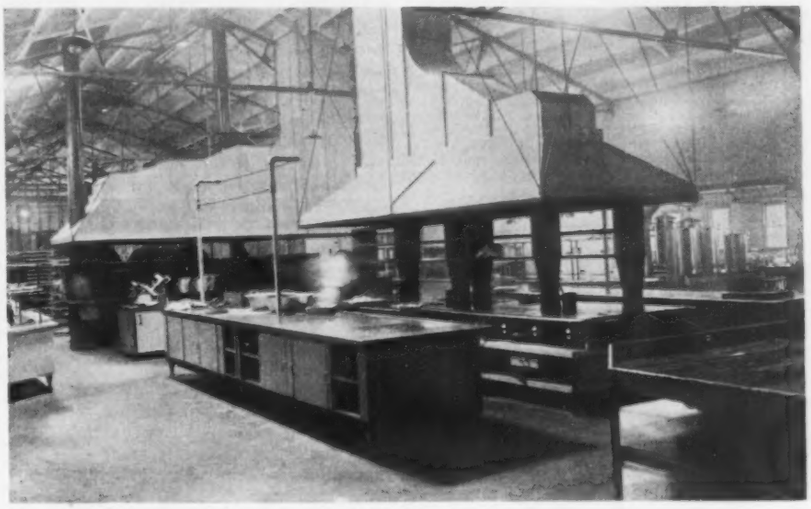
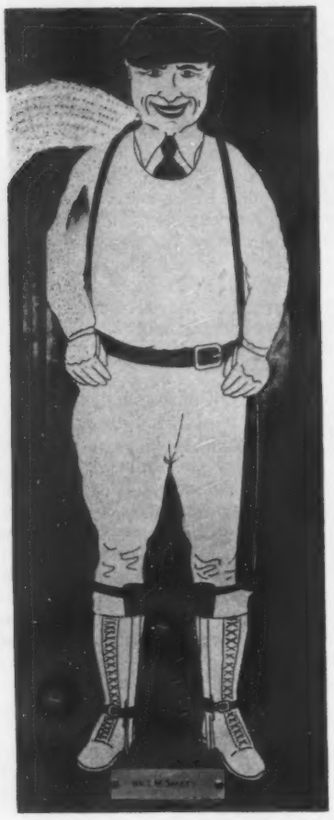
Electricity Cooks for Boulder Dam Builders



Even the potatoes are peeled electrically in the all-electric kitchen adjoining the mess hall of the Six Companies, Inc., at Boulder City, Nev. From this kitchen goes food to serve 3,000 men three meals a day, accomplished in 12 sittings because three shifts are working at present on Boulder Dam. The hall holds 1,150 when full. The savings-per-meal made possible by electricity amounts to quite a bit at the end of the day

El Paso Safety Lineman



LATEST addition to the bulletin board of the El Paso (Tex.) Electric Co.'s distribution department is the "safety lineman" shown above. The lineman is drawn on transparent paper, and by blocking the bulletin board approximately 8 in. from the wall, then constructing a box the same size as the figure, six 25-watt lamps wired into the box cause the lineman to stand out in bold relief. The irregular shaped bulletin, or balloon, opposite the right shoulder carries this message as if spoken by the figure:

"My name is Mr. I. M. Safety. I am not a member of the Distribution Department because I have two faces. The face I now have on I will wear until there is an accident in the department. At that time my face will change to a frown instead of a smile."

In case of an accident, this bulletin will be replaced by one stating how the accident occurred, as well as how it might have been prevented. The name of the man having the accident is placed beneath the picture and remains their 30 days, unless another accident should occur before the end of that period. The best safety record of the department, which at present averages 80 men, is 427 no-accident days. J. E. Jordan, superintendent of distribution, is a keen advocate of safety first.

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A RECENT DEVELOPMENT of Milton Shoenberg development laboratories, 604 Mission St., is a motion electrical flashing window advertising device which is being used in windows of several San Francisco concerns.

REHEARING ON PROPERTY VALUATION DENIED EDISON CO.—Petitions filed by the Southern California Edison Co. Ltd., asking a rehearing of recent decisions of the California Railroad Commission establishing values for condemnation by the City of Los Angeles of the electric distribution systems of the company in twelve districts have been denied. (See ELECTRICAL WEST, March 1, 132, p. 150.)

C. H. E. WILLIAMS CO., LTD., 509 Richards St., Vancouver, B. C., has been awarded the sub-contract for the handling of all electric wiring and installation work in connection with the new Burrard St. Bridge, now being erected in Vancouver at a total cost of approximately $2 millions.

P. C. E. A.

Engineers Present Year's Final Reports

A large and representative attendance combined with active interest in the proceedings to complete a successful year's activity when the Engineering Section held its last meeting of the year at Fresno, Calif., March 9-11. Final reports of committees and subcommittees were presented during the parallel sessions held during the three days of the meeting.

Meeting to discuss the year's work and lay plans for next year's study, the executive committee decided to expand the work of the Section to include the broader aspects of the electrical industry as well as new developments and operating practice which have characterized the activity of this committee in past years.

At the general luncheon held at the Hotel Fresno on Thursday, March 10, Dr. F. W. Thomas, president of the Fresno State College, addressed the Section, presenting an interesting and entertaining review of European conditions as he found them on a recent visit to the continental countries. H. H. Buell, chairman of the Engineering Section, introduced H. H. Schoolfield, chief engineer of the Pacific Power & Light and Northwestern Electric Cos., who was the Northwest Electric Assn.'s official representative at the meeting.

On Thursday evening J. M. Buswell, chairman of the accident prevention committee, presided at a mass meeting of foremen and supervisors and explained the responsibility of the foreman and supervisor in their relation to accident prevention. Following the meeting a dance, given by employees of the San Joaquin Light & Power Corp., was held in the auditorium to which members of the Engineering Section were invited.

Reviews of the various committee activities during the meeting follow:

Accident Prevention Committee

J. M. BUSWELL,
San Joaquin Light & Power Corp., Chairman

Committee activities included a review of reports from the N.E.L.A. accident prevention committee meeting which was attended by J. C. McClung. The benefits of first-aid training were discussed and its relation to accident prevention was stressed because the training gives the student knowledge of the seriousness of injuries and an appreciation of accident prevention, as well as diminishing the seriousness of accidents through the administration of prompt first-aid treatment.

Medical care and hospitalization for employees of utilities were then taken up from the standpoint of the employee and his need for this service at a moderate cost, and steps to provide such a service were discussed in detail. Accident prevention could be furthered by the recognition of accident-free records of employees when selecting men for employment, promotions and special assignments.

A summary of the serious accidents during 1931 was given by C. E. Mess, assistant engineer of the California Railroad Commission.

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Electrical Apparatus Committee

L. A. BUESE
Los Angeles Gas and Electric Corp., Chairman

Subcommittees of the electrical apparatus committee presented final reports for the approval of the committee. The subject of starting currents of across-the-line motors was taken up and the committee passed a resolution that approved starting currents of motors above 30 hp. which do not exceed the straight-line extension of the graph for locked rotor currents specified in the N.E.L.A. rules of 1923 for motors of 5 to 30 hp.

The electrical apparatus committee, feeling that the 6,900/115-volt transformer rating is inconsistent, will request that the subject of transformer ratings should be officially reopened and that action by the national committee should be taken to crystallize opinion on this subject. A motion was carried in the meeting recommending that the rating of 100 per cent be adopted rather than the 65 per cent rating which has been porposed for fuses. R. C. Denny, of the San Joaquin Light & Power Corp., presented a paper to the Section on "Adequate System Protection." New developments were then presented by manufacturers' representatives at the meeting.

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Foreign Systems Coordination Committee

G. H. HAGAR
Pacific Gas and Electric Co., Chairman

A description was given of the work of coordinating the power line of the San Joaquin Light and Power Corp. and the federal government with the toll circuits in Yosemite Valley. A brief description of the parallel from San Bernardino to the Hoover Dam as also given for the benefit of those who were not in attendance at the Los Angeles meeting.

Considerable discussion developed from studying the question of interference to low wave-lengths, such as are used in television. It was thought that the companies should study this subject in order to be prepared when the use of low wave-lengths becomes general.

A report of the national meeting in New York Feb. 4-5 was given, together with a report of Professor MacMillan's work at the University of Oregon on the subject of radio interference from pin-type insulators.

A progress report on the common primary and secondary neutral stated that the mechanics of fitting the rules agreed upon into General Order 64-A had been completed and that, after several postponements, the Railroad Commission had set the date of March 24 for the hearing.

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Hydraulic Power Committee

C. B. CARLSON
Southern California Edison Co. Ltd., Chairman

Various subcommittees submitted final reports on the year's activities which included the mechanical reliability of hydro-electric units, current research and practice in hdyro developments, and the economic phases of existing hydro-electric plants. J. M. Gaylord, chief electrical engineer of the Metropolitan Water District of Southern California, presented an illus-

trated description of the proposed aqueduct from the Colorado River to Los Angeles and vicinity. Mr. Gaylord outlined the various proposed routes and the route which was finally selected and difficulties which are involved in the project.

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Meter Committee

E. L. HUGHES
Pacific Gas and Electric Co., Chairman

Final reports were presented to the meter committee by the various subcommittees and an active discussion on various points ensued. Reactive kva. metering is becoming exceedingly important and three methods were presented for checking the connections for accurate reading. Meter obsolescence is a subject which has engaged the attention of the national committee, which has compiled data now available to member companies on the economical repairing and retirement of meters.

The discussions brought out the point that demand metering maintenance has been excessively high and this subject will be given additional study as no definite conclusions were forthcoming. E. L. Hughes presented a report on the activities of the national committee whose meeting he recently attended. The meeting concluded with a description of various special tests and investigations, included among which was a new vibration meter developed by the Pacific Gas and Electric Co. research laboratory.

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Overhead Systems Committee

D. D. SMALLEY
Midland Counties Public Serivce Corp., Chairman

The meeting of the overhead systems committee consisted primarily in the submission of completed reports by the various subcommittee chairmen.

The committee on distribution transformers submitted data to support their recommendation for standardization of transformer hangers, bushings and other transformer auxiliaries. Their report also included interesting information covering transformer loading.

The subcommittee handling the subject of line conductors submitted a very comprehensive and interesting report on sleeves and connectors which was the result of extensive tests made recently at various places along the coast. This committee's report also included a paper on "Conductor Vibration," which brings this subject up to date.

A special committee has been working diligently on the accumulation of data to support an application to the Railroad Commission for a reduction in the requirements for guying are set up in G.O. 64-a. These data are now complete and a resolution was presented and passed authorizing the submission of this application to the commission. This committee prepared a report under the auspices of the subcommittee on pole line structures. This subcommittee also presented a complete report on the inspection of structures in service.

A very excellent report was presented by the committee on protective devices and pole top oil circuit breakers. This paper dealt with rating of fuses and a motion was carried in the meeting recommending that the rating of 100 per cent be adopted rather than the 65 per cent rating which has been proposed. A number of methods of installing and maintaining pole top oil circuit breakers were presented and this subject as a whole was well covered.

The committe on grounding submitted a comprehensive report supplemental to the one presented last year.

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Prime Movers Committee

LEO J. KRAPS,
Southern California Edison Co. Ltd. Chairman

Eight subcommittees presented final reports, four of which were accepted for publication. Following a general discussion of steam plant problems E. Champion, of the New York office of the Ingersoll-Rand Co., presented an interesting paper on surface condenser design and operation. He described the calorimeter used for measuring heat transfer between steam and water, through condenser tubes, his talk being illustrated by slides showing test results and typical installations.

The session was concluded by V. F. Estcourt, the incoming chairman, who announced the appointment of new subcommittee chairmen and discussed plans for conducting the work next year.

Underground Systems Committee

J. C. McCLUNG
Los Angeles Gas and Electric Corp., Chairman

A short report was given on the National Section meeting, held in New York Feb. 1-5, by the chairman, who attended the meeting.

The development of low-cost underground construction was reported to have created a great deal of interest and it was predicted that much valuable information would be obtained from the many trial installations now being installed. This will influence future plans for underground construction, especially in the residential tracts.

Experiments and observations made in a study of the different types of ducts and of the pulling stress of cable through them were described in the report of the subcommittee on this subject.

The committee on the study of corrosion of lead has started several experiments and the results so far indicate that valuable results and information may be expected, and corrective measures discovered.

Improvement of cable manufacture was brought out in the discussion of the last "Cable Operation" bulletin, which shows the records and exeriences of many companies throughout the country. A description was given of the 115-kv., three-conductor submarine cable to be laid at Portland next month; the method of installation was also given. An interesting paper was read describing the new type of cable developed by Mr. Hochstadter, a three-conductor, paper-insulated lead-covered cable, to the outside of which pressure is applied by placing the cable in a welded gas pipe line under a pressure of 200 lb. As this pressure practically eliminates all voids in the impregnating compound, the operating voltage can be raised to more than twice that now permitted; also it will carry from 40 to 60 per cent more current.

In the discussion of manhole explosions it was brought out that by designing and installing a system which is properly ventilated, damages of this nature would be practically eliminated.

Much valuable data have been gathered on the use of the Kenotron test set through the experiences of the many companies that have been operating these sets.

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Santa Cruz Meeting Completes Annual Work of Commercial Section

BUSINESSLIKE in its sessions, the last conclave for the administration year of the Commercial Section, P. C. E. A., at Santa Cruz, Calif., March 17-18, closed the year's business with dispatch and allowed the hospitality of the Coast Counties Gas & Electric Co. to manifest itself in a manner long to be remembered. Even Mayor F. W. Swanton made the customary welcome on the part of a city official a unique feature, in that he proved himself a pioneer in the early electrification of Santa Cruz. With good humor he recited the history of the first 300-light steam plant which he and associates installed in Santa Cruz and the subsequent installation of the first hydro plant, which, had it worked successfully, would still have found him in the electrical industry. J. B. Wilson, president of the Coast Counties Gas & Electric Co., had opportunity to illustrate his welcoming speech by actual events.

J. Hugh Jackson, dean of the Graduate School of Business Administration, Stanford University, in a comprehensive talk reviewed the aspects of the business situation. As to foreign trade, he made the point that tariff walls kept trade from being what it really is, the trading of goods, and, therefore, brought about reprisals on the part of other nations who discriminate against American goods. "He who will not buy cannot expect to sell," he stated. This means American markets are being confined to domestic sales. He pointed out that as long as prices are on the decline the depression is not over. At the first sign of increase it may be considered over. For the past six months raw material price levels have held practically steady. Inventories of retail stores are at a minimum. Both good signs.

In financial circles hopeful signs were the Reconstruction Finance Corp.'s operations, which are bringing about a better psychological situation and stopping hoarding. Unbearably high taxes, so high that 25 c. out of every dollar of income goes into government expenditure, must be reduced or bankrupt the nation, he pointed out. The unemployment situation is not improving and wages must be adjusted downward. The international situation, he believes, has measurably improved. Altogether it was not a jubilantly optimistic talk, although constructive and informative, and, therefore, heartening. In commenting on the talk, Chairman Frank Weiss, of the Commercial Section, characterized business as in "low gear forward."

The Thursday morning session was concluded by a rapid fire presentation of a comprehensive highway lighting program by William P. Bear, Pacific Gas and Electric Co. He pointed out that the highway system of the state of California costs the populace 35 c. per capita. Figures showing the percentages of construction, operation and other expenses, also fatal and non-fatal accident totals, were used to demonstrate the necessity for well lighted highways. The installation costs and operation costs per mile would range between $830 and $1,285. His committee's recommendation was a 50-mi. demonstration installation to cost $130,000, which he justified by profitable eventual results. He cited the incident of the Timken Roller Bearing Co., which had built a locomotive of their own at a cost of $100,000 merely to demonstrate the feasibility of roller bearings on locomotives. He estimated that it would take two years to prepare the industry for this demonstration section of highway and that it would take five years more to sell 2,500 mi. of lighted highway.

Luncheon addresses Thursday noon were likewise features of the conclave. Hon. B. B. Snyder, California Legislature assemblyman, spoke on public utility merchandising from the aspect of state government. He deplored the tendency to ask for laws on matters which should be settled as a question of policy. He showed how interests of different kinds had sought at various

times for special class legislation on oleomargarine, trading stamps, chain stores, etc., and how each has been turned down either by the legislature or by referendum of the public. He concluded his talk by reciting principles enunciated by an Eastern utility and published in *Electrical Merchandising*.

George Rankin, Southern California Edison Co. Ltd., chairman of the Lighting Bureau, then introduced Clark Baker, who repeated in brief a lecture on home lighting which has been given in 35 meetings to over 2,100 employees of five utilities during the past year. Mr. Baker declared that he felt there was a possible way in which the story of really worth-while lighting equipment could be told, not only to employees, but to the public generally.

The Friday morning general session opened with the customary round table discussion. The first topic was air heating, which was introduced by H. H. Douglas, Southern California Edison Co. Ltd. He characterized the load as profitable on existing facilities but care should be taken, he said, in making extensions to develop further load of this character, except in well-planned installations. The large replacement business in heating equipment he described as the legitimate market for this type of load. He cited several instances where it has been successful for building heating, such as the Edison company's own building which has run only 20 per cent of the estimated kilowatt-hour consumption for the past year. He attributed this efficiency to what he called the application or utilization factor, which means that electric heat can be applied just exactly where, when and for as long as wanted without waste. Another notable installation mentioned was the Sunset Tower Apartment in Los Angeles with a 2,000-kw. load which is served by one 300-kw. transformer and through a very cold winter has never exceeded 230 kw. of demand. It is thermostatically operated throughout. The load factor averages 35 per cent. He also advocated electric heating for industrial offices because of its spread from there to domestic uses.

Other speakers in the round table discussion were C. A. Russell, of Wesix, Inc., who cited the advantages of thermostatic control and time metering for domestic and apartment house applications, and F. L. Moon, Los Angeles Gas and Electric Corp., who spoke on the commercial phases and in particular on the administration of a sales force to avoid duplicate selling efforts.

George C. Tenney, editor of ELECTRICAL WEST, opened the discussion on the subject, "What Constitutes a Power Company Lighting Department?" illustrating his remarks by lantern slides. He pointed out that the lighting department was dependent largely on the personal equation of the salesman, who must be technically informed and capable of applying his technical knowledge in the interests of sales of illumination, know all the fundamentals and sales points of good lighting and be able to create ideas to turn over to architects. He must also receive wise direction and be equipped with demonstration facilities by the management.

L. G. Gianini, General Electric Incandescent Lamp Department, asked the assistance of the air conditioning committee in taking care of the heating effect from lighting where the lighting is brought up to its proper intensity. Frank Weiss very emphatically stated that a competent lighting department manager must not only know the technique, but must be able to find his own prospects and sell them and not rely upon the commercial department to provide sales for him. A two-weeks' summer school on illumination at Stanford University was discussed also.

Reporting on three Eastern meetings to which he had been sent, W. A. Cyr, associate editor of ELECTRICAL WEST, told of the work on wiring being done nationally. At the wiring sales committee meeting at Buffalo, he said, a declaration of N. E. L. A. policy as to codes, standards, and wiring practices was being worked out. At a subsequent meeting, in New York, he found that residential wiring standards for adequacy were being developed by a joint industry conference. From the league managers' conference at Philadelphia a number of pertinent ideas relative to wiring and selling were reported by the delegate.

Following the close of the morning sessions Friday, the conclave adjourned to Mountain View Ranch, 6 mi. out of Santa Cruz in the redwoods, where luncheon was served by the Coast Counties Gas & Electric Co.

Committee sessions completed the year's work of all Commercial Section committees preparatory to the publication of reports in the May 15 issue of ELECTRICAL WEST.

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Purchasing and Stores Divisions Convene

Reports from the Stores, Purchasing and Standardization Divisions were heard at the Fresno (Calif.) conclave of the Purchasing and Stores Section, P. C. E. A., held March 10-12, with A. A. Charonnat, chairman of the Section, presiding.

With the exception of W. deWaard's paper on "Power Plant Storerooms," the reports of the Stores Division presented at this meeting were those read at the Section's Los Angeles meeting in December, 1931. Many new points, however, were brought out in the discussions following their presentation at Fresno.

Considerable discussion followed the presentation of a paper entitled "Legal Responsibilities" by T. B. Parks and Douglas Van Dyke. The question involved was when the title to goods passed from the vendor to the purchaser, the general opinion being that the title to materials purchased f. o. b. destination did not pass until the shipment was received by the purchaser.

It was decided by the standardization and simplification committee to continue the compilation of data on the various types and sizes of line hardware materials used by the member companies until the entire subject of pole line hardware is covered. The lists, when complete, will be turned over to member company engineers in order that they may make recommendations for the elimination or standardization of the materials listed. It was recommended that the weight of standard packages for pole line hardware be kept to a maximum of 125 lb.

G. N. Riblet presented a paper on "Stores Accounting Organization" for the Stores Accounting Division, and F. Kraut, R. O. Cross and G. H. Grummett reported on "Reclamation and Salvage Accounting." A letter from H. F. Rea on "Simplified Invoices" was read at the meeting.

Considerable discussion on insulating oil was brought out by the reading of a paper, "Requests for and Routine of Material Testing," by A. D. McIntyre at a meeting of the material testing committee.

Northwest Association

Commercial Section Reports Summarized

A summary of the reports and papers with discussions thereon presented at the annual Commercial Section conference held at Portland, Feb. 18-20, 1932, follows.

Power Bureau

B. P. BAILY
Pacific Power & Light Co., Chairman

After preliminary remarks by Glenn L. Jackson, The California Oregon Power Co., section chairman, and P. M. Parry, Utah Power & Light Co., president of the association, Mr. Baily introduced the reports of his bureau by calling attention to the possibility existing at present for getting closer to the power customers of utility companies.

Under the title, "Are Small Industrial Heating Loads of Value to the Central Station?", J. D. Frantz, General Electric Co., chairman of the industrial heating committee, analyzed the cost of securing small heating loads in relation to the value of these loads to the central station, coming to the conclusion that too few rather than too many man-hours, generally speaking, have been spent in securing this class of business.

The report of the commercial cooking committee by P. E. Stowell, Dohrmann Hotel Suply Co., chairman, discussed ways in which the dealer in hotel supplies should fit into the selling plan of the central station in this field. Ways of overcoming sales resistance of the restaurant man to the price of electrical equipment and to the sometimes supposed high cost of electrical energy were presented.

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Customer Relations Committee

K. M. ROBINSON
Idaho Power Co., Chairman

The report of this committee, presented by W. T. Neill, Pacific Power & Light Co., in the absence of the chairman, presented information regarding the practices now in effect among utility companies in the territory pertaining to forms and procedure in

handling various phases of customer contacts. The result of a questionnaire on methods of handling new customers, changes in location, trouble complaints, collections, telephone calls, and similar points of contact, were summarized.

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Merchandising Bureau

R. B. McELROY
The Washington Water Power Co., Chairman

Mr. McElroy explained that bureau reports this year would to a large extent be concerned with ways in which utility companies can stimulate the sale of utilization devices through all channels.

The report of the Electric Range Committee, by V. H. Moon, Pacific Power & Light Co., chairman, discussed ways in which the independent dealer and retail salesman could be made a real factor in the distribution of ranges; suggested that utility companies standardize on larger model ranges and be quality merchants, not price merchants; and recommended that some thought be given to bringing down the cost of range wiring without sacrificing safety and adequacy. In discussing the first of these points, the report summarized a survey of member companies in which salient features were that a plan for financing dealer range sales on a comparable basis with terms offered by utility companies would help toward making many dealers a greater factor in the sale of ranges and that such a plan is being considered; and that practically all utility companies either have in effect or are contemplating salesmen's compensation plans which in some manner take into consideration ranges added to the lines by dealers as well as by the company.

Methods of approach in selling water heating formed the subject of the report of that committee by its chairman, B. A. Hall, Pacific Power & Light Co. Modernity, including the automatic factors of electric water heating, health appeal, and seasonal appeal, was discussed as the principal selling point.

The broader aspects of salesmanship were considered under three headings in the report of the general merchandising committee by L. W. Brainard, Idaho Power Co., chairman. (1) Organization planning was considered more necessary now than ever and it was recommended that the plan be developed from the standpoint of load building rather than from the standpoint of merchandise sales. (2) The development of a commercial consciousness among all employees in the furtherance of the load building program was declared desirable particularly in rural territorities and small communities. (3) The importance of training salesmen intensively was stressed.

Four other subjects related to merchandising and load building were introduced by outside speakers at the sessions devoted to the merchandising bureau as follows: Papers dealing with load building in Oklahoma and Kansas by A. A. Brown, salesmanager, Oklahoma Gas & Electric Co., and by William H. Hodge, vice-president, Bylesby Engineering & Management Corp., had been sent to the conference for presentation and were summarized by Berkeley Snow, ELECTRICAL WEST. These papers reviewed the anti-merchandising laws of Oklahoma and Kansas and indicated that since these laws had been in effect the bulk of the electric appliance business in those states had been done through the large chain mail-order organizations, and that the condition of the local merchants had not been benefited. Results of the poll taken among editors of Kansas newspapers, revealing an almost unanimous opinion that the Kansas anti-merchandising law had been a detriment rather than a benefit to the state, were portrayed.

Defining the difference between testing research and invention, Dean H. S. Rogers of the School of Engineering, Oregon State College, Corvallis, suggested that testing to determine performance should be based on standards and should be centralized at one point. On the other hand, research to solve problems of equipment should be decentralized in order to take advantage of the varying types of personnel and equipment found in different institutions. He classified the development of new applications under invention and suggested that this kind of experimentation called for still a different type of personnel and could best be accomplished by an allocation of specific problems to the institution best suited in personnel and equipment to solve each particular problem.

A method of approach to the analysis of the market for electric appliances in the territory of any company was outlined by George C. Tenney, editor of ELECTRICAL WEST, San Francisco. In a hypothetical case of a company having 50,000 residential customers, using saturation figures for the Northwest territory he showed that there existed a potential appliance volume of $22,500,000 and a potential additional annual consumption of 340,000,000 kw.-hr. He showed also that a tremendous market for house wiring and for central station apparatus would be created by such a program and sounded the appeal that the development of this business was a combined industry sales problem rather than a problem resting wholly with the central station commercial man.

The last of the subjects related to the Merchandising Bureau was an accounting study of the value to the company of load added by the merchandising department, by H. O. Hussong, The California Oregon Power Co. In this analysis the cost of adding load by the merchandising department was applied to the operating revenues of the company along with other charges against these revenues and the conclusion was reached that "after paying all costs which could possibly have been charged against the merchandise department, the expected return from each kilowatt of added load more than justified the sales policy and apparent loss of the merchandise department. It was found that the load placed by the department began to return more than all charges immediately and that it was not necessary to proceed further to justify the department by including all earnings of the appliances added during the life of the appliance, nor by including the earnings made possible by the stimulation of competitive dealers."

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Refrigeration Bureau

G. M. GADSBY
Utah Power & Light Co., Regional Director

Mr. Gadsby summarized the results of the first year of the refrigeration campaign, stating that in the five Northwest states about 58 per cent of the quota was reached in 1931. The quota for 1932 in these states is 40,500 units, and several factors which might be expected to contribute to the development of this business were cited.

Supplementing the discussion of refrigeration, Raymond Gill of the engineering department, Frigidaire Corp., by invitation described the latest air conditioning equipment put on the market by his company.

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Lighting Bureau

L. B. GAWAN
Utah Power & Light Co., Chairman

A summary of these methods used by major companies in the territory to promote the lighting business indicated that the various population centers in the state were all supplied with lighting service departments operated by the companies or by cooperative elecrical leagues. These departments furnish technical illuminating engineering service and plans and specifications to architects, builders, and commercial and industrial customers, and use other means as well to spread accurate information on lighting to the community.

Comparing the potential revenue from street, highway and flood lighting installations to the revenue received from domestic customers, the report of the outdoor lighting committee by H. C. McDaniels, Pacific Power & Light Co., chairman, indicated that not enough attention was being given at the present time by utility companies to the promotion of these types of lighting load. Methods of securing this class of business were outlined.

A report of the electrical advertising committee by J. H. Shaw, Utah Power & Light Co., chairman, urged a closer coordination of the sales programs of sign manufacturers and of the lighting departments of central stations. It was brought out in discussion that sign and show-window lighting should be sold to the customer on an advertising basis rather than from the standpoint of a lighting salesman.

A discussion of the barrier of inadequate wiring in old buildings to the selling of an adequate commercial or industrial lighting installation was discussed at some length in the report of the commercial and industrial lighting committee by M. S. Glenn, Northwestern Electric Co., chairman. The report recommended close cooperation between central station lighting departments, contractors, and local inspection departments, and cited the city of Portland as an example of improved wiring standards having been brought about by such cooperation.

The report of the domestic lighting committee by W. E. Potter, Incandescent Lamp Department, General Electric Co., chairman, decried the small amount of promotional effort that has been applied to securing adequate lighting in the home, forcibly brought out the vast market yet to be sold, and offered a yearly program of home ligthing activities by months. The report also told of inexpensive kitchen lighting units suitable for campaigns among minimum-bill customers as a step toward educating such customers to the advantages of better lighting. In discussion the importance of educating employees of utility companies in lighting was stressed and a method of conducting lighting courses for employees was outlined.

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Rural Electric Service Committee and Farm Equipment Committee

T. W. DELZELL
The California Oregon Power Co., Chairman

Mr. Delzell reported that the rural electric service committee was making progress with the first edition of its handbook for rural service representatives. This handbook is to be issued in loose leaf form so that it can be expanded, contracted or amended to suit changing conditions.

The report of the farm equipment committee reviewed the progress made in electrifying farms in the five Northwestern states to the point where 34 per cent of all the farms in these states now received central station service, discussed the present conditions in farming areas, and offered recommendations for the future as follows:

1. Give continuous, reliable service.
2. Advertise steadily.
3. Demonstrate equipment in the field.
4. Employ trained men to contact farmers.
5. Have a liberal extension policy and a satisfactory combination rate.
6. Instruct the farmer in the use of equipment.
7. Train all employees to give accurate information on farm uses.
8. Adequately service customers' equipment.
9. Keep records of farm business.
10. Cooperate with dealers, merchants and county agents.

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Engineers' Program of Unusual Interest

To mention but a few of the subjects of timely interest on the program of the Engineering Section of the Northwest Electric Light & Power Assn., meeting at Portland April 13-15, A. H. Greisser, of the Portland General Electric Co., will discuss "Diesel-Electric Generating Stations" on the April 14 morning program; Prof. F. O. McMillan, of Oregon State College, will talk on "The Coordination of High Voltage Transmission Lines With Radio" on the morning of April 13, and "Losses in Distribution Systems" will be the subject of P. P. Ashworth, Utah Power and Light Co., on the afternoon of the 13th.

The results of a study of the practices of Northwest companies will be revealed in a report on system planning for economical transmission, substation and distribution development for rural service to be made at the April 15 morning session, and on the afternoon of that day new developments and operating experience in "Frequency Load Control" will be discussed by S. Logan Kerr, of I. P. Morris & Co., and J. S. McNair, of The Washington Water Power Co., at a meeting of the hydraulic power committee.

A trip to Vancouver has been planned for Saturday, April 16, for inspection of the 115-kv. oil filled submarine cable now being installed by the Northwestern Electric Co. across the Columbia River. The Ariel project may be visited by those desiring it on Saturday afternoon.

Meetings

Coming Events

American Institute of Electrical Engineers—Annual Pacific Coast convention, Vancouver, B. C., Aug. 29-Sept. 2, 1932.

Electrical League of Colorado—Seventh annual state-wide electrical conference, Albany Hotel, Denver, April 27, 1932.

Illuminating Engineering Society—Twenty-sixth annual convention at New Ocean House, Swampscott, Mass., week of Sept. 26, 1932.

International Association of Electrical Inspectors, Northwest Section—Seventh annual convention at Wenatchee, Wash., Sept. 6-8, 1932 (tentative).

Southwest Section—Convention at Santa Barbara, Calif., Sept. 12-14, 1932.

Western Chapter—Annual meeting at Albany Hotel, Denver, April 27-28, 1932.

National Electric Light Association—Annual convention and exhibit, Atlantic City, N. J., June 6-10, 1932.

Northwest Electric Light & Power Assn.

Engineering Section meeting, Portland, April 13-15, 1932.

Accounting Section meeting, Spokane, April 18-19, 1932.

Pacific Coast Electrical Assn.—

Annual convention at Huntington Hotel, Pasadena, Calif., June 14-17 1932.

S. F. ELECTRICAL DEVELOPMENT LEAGUE HAS NEW OFFICERS—Al C. Joy, manager of the publicity department, Pacific Gas and Electric Co., San Francisco, is the new president of the San Francisco Electrical Development League, and John W. Otterson, McGraw-Hill Co. of California, is secretary-treasurer. Directors elected for one year include Willis Winter, to serve for the unexpired term of the directorship left vacant by Mr. Joy; H. M. Thomas, manufacturers' agent; and Edward Martin, electrical contractor. Directors elected for two years are Allan G. Jones, General Electric Co.; Earle A. Crellin, Pacific Gas and Electric Co.; and H. W. Crozier, consulting engineer.

ELECTRIC SUPPLIES DISTRIBUTING CO., San Diego, chose the following officers at its recent annual election: President, Sam L. Hall, succeeding Walter C. Wurfel; vice-president and manager, Fred G. Goss, succeeding Mr. Hall; secretary-treasurer, Basil Guthrie, succeeding Grace Showly. Mr. Hall was one of the original organizers of the company and has been active in the management since its incorporation in 1917. Mr. Goss, with the exception of a few months' residence in Los Angeles, has been associated with the company since its start and for several years has been sales manager. Mr. Guthrie has been with the company for over ten years and during most of that period has been purchasing agent.

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"Dark Horse" Wins San Francisco League Election

BECAUSE 1932 is a presidential year, the inauguration of Al C. Joy as president of the San Francisco Electrical Development League took the form of a mock convention. Every participant was named Zilch, and the failure of any candidate to obtain a majority led party bosses to run in "Dark Horse" Joy as a compromise. Conventioneers pictured are: (top, left to right) Frank Bevan, as an earnest Chinese hatcheteer; Earle Crellin, politician; Ralph Flynn, reporter; Bert Reynolds, Gov. James Rolph, Jr.; Harry Thomas, Japanese ward boss; C. W. Leihy, dark horse bodyguard; (bottom, left to right) George Tenney, Bolshevist candidate; W. A. Cyr, convention keynoter; President Joy; Ernest Ingold, chairman; Ed. Perkins, prohibitionist; Pat Curran, Fascisti candidate; and (front) the dark horse.

Personals

B. C. Electric Appoints Merchandise Manager

W. C. MAINWARING, for the past fourteen years district sales manager for the Northern Electric Co.'s branch in Vancouver, B. C., has been appointed to head the merchandising

W. C. MAINWARING

activities of the British Columbia Electric Railway Co., Ltd., on both the mainland and on Vancouver Island, with the title of merchandising manager. This is a new position made necessary by the expansion of the merchandising department in recent years. Formerly that department on the mainland came under the joint supervision of J. Priestman, as merchandise superintendent, and W. E. Dawson, as merchandise manager, both affiliated with the department headed by E. E. Walker, sales engineer. Mr. Priestman will return to the light and power department under Mr. Walker, whose assistant he was for many years. Mr. Dawson will continue to be associated with the merchandise department. S. J. Halls, manager of the light and power department on Vancouver Island, will continue to manage merchandising activities there, but Mr. Mainwaring will have direction and supervision of the merchandising branch.

There has been no change in the merchandising policy of the company, which will continue to sell appliances on the same terms and in the same aggressive way as it has in the past.

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IRA S. DAVISSON, veteran commissioner of public utilities in Tacoma, who is generally credited with being an important factor in building that city's municipal electric system to its present size, was re-elected last month by a vote almost three times as large as the total of his three opponents. This is Mr. Davisson's fourth term in the city council.

E. H. (BILL) BELL has been appointed sales manager for the Jeffries Transformer Co., Los Angeles.

T. H. UNDERWOOD, formerly affiliated with the Standard Management and Operating Corp., of San Francisco, has been transferred to the Coast Counties Gas & Electric Co. as assistant electrical engineer in charge of construction and maintenance, with headquarters in Santa Cruz, Calif.

Obituary

Frank G. Baum Dies In Accidental Fall

A VERITABLE genius has been lost to the world of electrical development in the death of Frank G. Baum, who sustained fatal injuries in a fall from the roof of a Redding (Calif.) hotel last month while inspecting newly installed equipment.

His was a colorful career. Born 62 years ago in Missouri, one of a large family, he came to California in his early youth to carve out his own career. He worked his way through Stanford and after graduating in 1898 became an instructor in the Department of Engineering. His first experience in public utility work was in 1899, when he made tests of the Colgate-Sacramento transmission line, the first high-voltage accomplishment. He did similar work for the Standard Electric Co. upon its Electra-Oakland transmission line, and later entered the employ of the California Gas and Electric Corp.

After the Pacific Gas and Electric Co. was organized he became chief engineer of hydro-electric development, and in that capacity visualized the South Yuba-Bear River development, with its main storage reservoir at Lake Spaulding and its string of power houses starting at Drum, on Bear River. Later on he became consulting engineer of the company and did yeoman service in the development of the Pit River project, designing the Hat Creek plants and the Pit River string beginning at Pit No. 1, where the waters of Fall River are diverted from the valley of that name and conveyed by tunnel through the hillside into the Pit River gorge. He severed his connection with the company in the spring of 1923 and from that time devoted himself to private practice and experimental work.

He established a laboratory on his ranch at Hat Creek, in the Pit River country, and developed and patented several useful inventions, mostly designed for the improvement of transmission facilities. He is the acknowledged father of 220,000-volt transmission and his efforts were constantly directed toward higher voltage accomplishment. Besides doing a great amount of work for the Westinghouse company in this country, Mr. Baum extended his operations abroad. He was employed in hydro-electric research work for the German government and for private hydro-electric enterprises in that country, a task that occupied some years. He was also known in Peru, where he developed hydro-electric enterprises for California interests.

Mr. Baum was a man of vision, but not what is known as a visionary, for many of his visions produced profitable as well as practical results. At the time of his death he had perfected an air-conditioning device using the fan motor principle.

The several technical books and treatises which Mr. Baum found time to publish have proved of great value to the electrical industry. One of his spectacular accomplishments was the publication of a United States Atlas illustrating and describing a complete system of inter-connected high-tension transmission lines stretching over the entire continent, from the Atlantic to the Pacific and from the Canadian border to the Mexican line. He was the author of "The Alternating Current Transformer," and of numerous articles on alternating current power transmission. He was a member of the American Society of Mechanical Engineers, American Society of Civil Engineers, and American Institute of Electrical Engineers, of which he was made a Fellow in 1914.

JOSEPH L. KLINE

FRANK G. BAUM

Industry Loses Old Friend In Death of J. L. Kline

JOSEPH L. KLINE, president and manager of the Western Light & Fixture Co., Los Angeles, whose death on Feb. 19 was announced last month in ELECTRICAL WEST, was one of the most beloved figures in the electrical industry in the West.

A native of Denver, where he was born in 1861, Mr. Kline in his early youth removed to Seattle, where he remained until 1910 in various merchandising occupations. Later he went to Los Angeles where he started a retail gas fixture supply store on Broadway. As the demand for electrical supplies and fixtures increased, he kept pace with it, with the result that he soon had a completely stocked electrical supply store. As many electrical contractors made a practice of purchasing their supplies from the Western Light & Fixture Co., the wholesale branch of the business grew in volume and Mr. Kline abandoned the retail end of it.

Despite the heavy demands of his business, Mr. Kline was never too busy to lend his help to any project for the good of the electrical industry, and he took an active part in its affairs. He served as a member of the advisory committee of the California Electrical Bureau in 1926 and was chairman of the Pacific Division, National Electrical Wholesalers' Association, for the same year. His loss will be felt keenly by his many friends in the electrical industry, to whom his genial personality, kindly helpfulness and wise council had greatly endeared him.

THOMAS FOULKES, founder of Foulkes Electric Co., Los Angeles, and one of the pioneers in the electrical trade in the West, died in southern California recently. Mr. Foulkes first came to the West in 1891, working successively in Helena, Montana, Portland and San Francisco. Later he became chief engineer of the lighting plant of the City of Pasadena, then owned by L. C. Torrance. He started in the contracting business in Pasadena in 1896, later moving his place of business to Los Angeles. The present business there bearing his name and headed by his son, Roy T. Foulkes, is the outgrowth of that start. Mr. Foulkes was the first president of the Los Angeles Board of Public Utilities; he was a member of the American Institute of Electrical Engineers at the time of his death.

W. A. RAYMAKER, retired construction foreman of the Southern California Edison Co. Ltd., died in Los Angeles March 22 at the age of 68 years. Mr. Raymaker had spent 30 years in the service of the Edison company when he retired on pension in 1926.

DAVID F. DRAKE, pioneer electrical engineer and friend of the late Thomas A. Edison, died at his home in San Diego on March 23. Mr. Drake installed the first arc lighting systems in New York City and Chicago.

GEORGE LUTHER, formerly branch manager for the Electric Storage Battery Co., Seattle, died in Chicago, Feb. 9, after a short illness. Recently he had been serving as national executive secretary for Sigma Xi.

HARRY S. WHITING, San Francisco district sales manager for the Aluminum Co. of America, died in that city March 9 following a heart attack.

Contractor Dealer Inspector

Northwest Inspectors Announce Committees

Announcement of committee appointments in the Northwestern Section, International Association of Electrical Inspectors, is made by F. D. Weber, secretary-treasurer. The chairmen of the various committees are as follows:

REPRESENTATIVES ON ELECTRICAL COMMITTEE, N.F.P.A.
F. D. Weber, Oregon Insurance Rating Bureau, Portland
L. W. Going, Chief Electrical Inspector, Portland

STANDING COMMITTEES
Clearing House Committee—
L. W. Going
Membership Committee—
H. A. Patton, Washington Surveying & Rating Bureau, Seattle
Meetings and Paper Committee—
E. B. Morrison, Oregon Insurance Rating Bureau, Portland
Electrical Fires & Accident Committee—
Charles Gallant, State Electrical Inspector, Seattle

GENERAL COMMITTEES
Article I, II, III—
F. D. Winegar, Chief Electrical Inspector, Salt Lake City
Article IV—
S. B. Clark, Northwestern Electric Co. Portland
Article V—
L. W. Going
Article VI, VII—
F. H. Murphy, Portland General Electric Co., Portland
Article VIII—
L. R. Elder, General Electric Co., Portland
Article IX—
E. B. Morrison
Article X, XI—
H. S. Jenkins, City Electrician, Bellingham
Article XII, XIII, XIV—
E. G. S. Pryor, Underwriters Laboratories, Seattle
Article XVI, XVII—
A. M. McLean, Deputy Electrical Inspector, Portland
Article XXX, XXXI—
J. F. Julian, Electrical Inspector, Wenatchee
Article XXXII—
N. J. Sankela, Pacific Millers Insurance Co., Seattle
Article XXXIII—
F. H. Rogers, City Electrical Inspector, Medford
Article XXXV, XXXVI, XXXIX—
H. S. Jenkins
Article XXXVII—
I. B. Sturges, Deputy Electrical Inspector, Portland
Article XXXVIII—
Ernest Russell, Deputy Electrical Inspector, Portland
Article L—
William Myers, State Electrical Inspector, Portland
Article LX—
J. F. Gray, Deputy Electrical Inspector, Portland
Committee on Inspection Forms and Procedure—
A. M. McLean
Committee on Temporary Wiring in Fairs, Exhibitions, Outdoor Speedways and Circuses—
H. S. Jenkins
Legislative Committee—
F. H. Murphy
Uniform Electrical Ordinance Committee—
F. C. Lyman, Deputy Electrical Inspector, Portland
Committee to Investigate Desirability of Using Nothing Less Than No. 12 B&S Gage Wire as a Minimum Instead of No. 14—
W. R. Grasle, E. L. Knight Co., Portland
Associate Editors News Bulletin Committee, Northwestern Section, I.A.E.I.—
E. G. S. Pryor, E. Russell, W. C. Mainwaring, B. C., Electric Railway Co., Ltd., Vancouver, B.C.
Committee on Adequate Wiring—
H. A. Patton

The 1932 convention of the association is to be held at Wenatchee, Wash., Sept. 6-8.

Utah Electragists Plan State Convention

A state convention to which all electrical men and their employees are invited, to be held early in April, is the plan of the Northern Utah chapter of the Association of Electragists-International. The convention will be held in Salt Lake City, with contractors, dealers, utility, state and county officials and wholesalers invited. A program and banquet are being arranged.

Edward H. Eardley, for the thirteenth time president of the contractors' association, was named as the first president of the newly organized Electragist chapter. Marthinius A. Strand is vice-president, John C. Jacobs is treasurer and Robert E. Bartlett is secretary of the chapter. Its purposes are strictly educational, with meetings held each Thursday evening at the Chamber of Commerce Bldg. Attendance, according to Mr. Bartlett, is practically 100 per cent, with the programs including regular business and an educational feature at each meeting.

Contractor and citizen, Edward Eardley, president of the newly formed Northern Utah chapter, A. E. I., always has been a leader

Mr. Eardley is a pioneer in the electrical business in Salt Lake City. Born there 53 years ago, 40 years of his life have been spent in the electrical business. His education, a practical one, has been in actual experience. For 26 years he has been an electrical contractor and dealer, during which time he has handled such installations as the Mormon Temple, the lighting of the grounds about it, the Mormon Tabernacle, the Church Administration Bldg., exterior lighting at the state capitol grounds, the Deseret Bank Bldg., St. Mary's of the Wasach, Liberty Park driveway lighting, Salt Lake City Post Office and others. He has been active in church circles, civic affairs, chamber of commerce, president of the Utah Manufacturers Assn., a candidate for mayor, and is a public speaker of note.

Sacramento Convention Draws Electragists

Sandwiched in between a going and return trip aboard the river steamer *Delta-King*, the spring meeting of the California Electragists is being held at Sacramento as this issue goes to press. Details of the meeting will be reported next month.

Arrangements for the entertainment and boat excursion were in the hands of Spencer Moore, P. G. and E. Co., George Smith, Smith Electric Co., and Charles Shipman, Atlas Electric and Engineering Co., all of San Francisco. The program for the convention was being arranged by Edward Martin, president of the California Chapter.

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Mountain Chapter Inspectors to Meet

Taking advantage of the annual meeting of the Electrical League of Colorado, the Rocky Mountain chapter, Western Section, International Association of Electrical Inspectors, will meet at Denver April 28, the day following the league meeting. Inspectors from Colorado, New Mexico, and Wyoming are expected to be present, according to V. C. Moulton, secretary of the chapter.

Among subjects to be discussed are the 1931 N.E. Code, suggested uniform wiring ordinances, electric signs, especially neon, and inspectors' problems and interpretations.

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ORMAND LUTZ, registrar of contractors for the San Francisco district under the contractors' license law, has announced that his offices are to be moved to Room 505 at the new State Bldg. annex, 450 McAllister St., at the Civic Center, San Francisco. Mr. Lutz has been making informal talks to a number of interested meetings telling of the work and of the results of the contractors' license law in California. (See report in this issue, p. 170.) According to a late announcement by Carlos W. Huntington, registrar of contractors, Sacramento, more than 23,600 contractors are now licensed to do business in that state. An official list will soon be issued to all municipalities and will be available to those desiring a copy at cost.

CENTRAL ELECTRIC CO., since 1907 contractors in San Francisco, have decided upon a novel specialty line. From years of experience they have made a selection of tools, ladders, and accessories used in electrical construction work, including such items as bolts, screws, lard oil and special hammers, and are keeping an ample stock on hand to fill quickly orders from contractors for such items. Instead of requiring time-wasting shopping around for such items, they may be obtained by telephone from this firm. Full details of this set-up will be published in a future issue.

PURCHASE OF THE M. J. WALSH ELECTRIC CO., Portland, by J. G. Galarneau and A. R. Johnson was announced early in March. Mr. Galarneau was former secretary and assistant manager of the company for twelve years, while Mr. Johnson had been superintendent of the wiring department for eight years. The Walsh company, founded in 1892, has for many years conducted a contracting and fixture manufacturing business, and in September, 1931, moved to larger quarters at 149 Twelfth St. where the same type of business will be operated by the new owners.

STERLING ELECTRIC CO., of which Edward Martin, president of the California Electragists, is proprietor, has moved its office and shop to 218 Clara St., San Francisco.

MARINE ELECTRIC CO., San Francisco, recently finished the rewiring of the remodeled Palace of Fine Arts, the remaining building of San Francisco's 1915 World's Fair. The building has been remodeled to provide a large display room for fairs and exhibits, and will also house a number of indoor tennis courts. An excellent lighting job laid out by Wm. P. Bear, P. G. and E. lighting specialist, was installed. First to use the new quarters for an exhibition will be the General Motors Corp., with a comprehensive display of all of its automobiles, refrigeration, air conditioning, radio, Delco lighting plants and other products.

CALIFORNIA ELECTRAGISTS' and San Francisco Electragists' headquarters offices were removed during the past month from the Call Bldg., San Francisco, where they have been maintained for a number of years, to 604 Mission St., room 604, retaining the same telephone number, Garfield 0444.

L. H. BENNETT, speaking on the "Merchandising Outlook for 1932," was the feature attraction of the March 3 meeting of the Santa Clara Electrical Development League. Mr. Bennett is president of The L. H. Bennett Co., Ltd., San Francisco. The meeting was held at San Jose. The electrical show committee reported notable progress on the plans for the spring electrical show, scheduled for April 1.

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Seattle Revises Its Electrical Ordinance

Seattle's electrical ordinance, long one of the most restrictive in the country, is under process of revision, a work started in 1925 and last month introduced to the city council and by it referred to the public safety committee. The new ordinance has the approval of the electrical code revision committee, representing the Electric Club, Building Owners and Managers Assn., Associated General Contractors, Washington Survey and Rating Bureau, Puget Sound Power & Light Co., Seattle City Lighting Dept., the fire marshall and the Department of Buildings.

Deplore Substandard Appliances and Cords

In a resolution addressed to the pulic through newspapers and to merchants by letter, the Southern California Chapter, Southwestern Section, International Assn. of Electrical Inspectors, calls attention to the danger inherent in the use of inferior, substandard electrical cord, devices and appliances. It claims half of the fires from electrical sources to be caused by misuse of cords and appliances, particularly since cords are run under rugs and in contact with drapes and furniture. Then it calls attention to the established Underwriters' Laboratories and of their testing and labeling of safe electrical equipment, and ends by urging cooperation of public, press and merchants to inform the public at large on the need for caution in the purchase and use of such equipment.

The committee that drafted the resolution, which was heartily endorsed, consisted of A. E. Johnstone, F. J. Connolly, and H. G. Ufer.

At the same meeting Frank A. Short, president of the Southwestern Section, announced the proposed revision of the State Electrical Safety Orders of the Industrial Accident Commission, and that the new draft would contain much of the National Electric Code. James M. Evans asked for suggestions or recommendations on any needed changes in the provisions of Articles 1 to 5, inclusive, as demonstrated by experience since the issuance of the 1931 code.

H. V. Dobson, city electrician, Santa Barbara, was selected as chairman of the chapter for this year, with T. C. Combs, city electrician, Uplands, secretary.

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Stopping Substandards

"They shall not pass" may have been a French slogan at Verdun but to Sam Curtis, chief inspector, Department of Electricity, San Francisco, it is final word on the inferior and sub-standard appliances offered for sale in San Francisco since the adoption of its new ordinance. A ten cent toaster and a dollar heater that burned a sixty dollar hole in an expensive rug are Exhibits A and B

Estimators Name Officers, Committees

Electrical Estimators of Los Angeles, formerly known as the Estimators' Section, announced its new officers for the year and a list of its committee personnel at a recent meeting. M. C. Williams, general manager of the R. R. Jones Electric Co., Los Angeles, was elected the new president to succeed L. H. Ellet, Quality Electric Co., who upon retiring was presented with a fountain pen engraved with his name. Lauren G. Hyde, another past president, made the presentation. Harry Hamm, of Hamm and Smith, Los Angeles, was named vice-president; P. A. Shrader, recording secretary, was re-elected, as was M. L. Fish, treasurer. The executive board now consists of R. L. Booth, W. L. Hyde, L. H. Ellet and P. N. Mactolf.

The following committees were named:

Entertainment—R. L. Booth, chairman; J. W. Rose, W. L. Robar.

Advertising—J. W. Rose, chairman, M. L. Fish, P. A. Shrader.

Ordinance—L. H. Ellet, chairman; W. L. Robar, J. W. Rose, Vic Sayre, Harry Hamm, C. J. Bennett.

Engineering—R. L. Booth, chairman; H. K. Burdick, P. N. Mactolf.

Attendance—C. J. Bennett, chairman; Harry Hamm.

Editorial—P. A. Shrader, chairman; J. W. Rose, H. N. Beecher, Frank Short, Jas. Evans, H. G. Ufer, Otto Wiemer.

Programs—January, C. J. Bennett; February, H. K. Burdick; March, Lauren W. Hyde; April, Otto Wiemer; May, W. L. Robar; June, P. N. Mactolf.

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SAN JOAQUIN COUNTY ELECTRICAL DEVELOPMENT LEAGUE, at its March 3 meeting held in Stockton, Calif., selected its board of directors for the year and changed the date of its meeting night to the second Thursday of each month, so as not to conflict with the Santa Clara County league meetings. The directors appointed upon suggestion from President Ray Bass, were Elmore Abbott, Charles Sengstacken, Walter Yost, R. W. Pratt, Ward Schafer, and Carl Frenderberg, each of which was made the chairman of the following committees, respectively: fraternal and attendance, public relations, membership, finance, program and educational and publicity.

V. F. MCKENNY, president of the Ne Page-McKenny Co., electrical contracting firm of Seattle, Portland and San Francisco, was a recent visitor to the San Francisco office of the firm from his home in Seattle. C. B. Kenney, manager of the San Francisco and Oakland offices, was his host.

THE CLARENDON ELECTRICAL SHOP is a newly opened store at 2575 Clarendon Ave., Huntington Park, Calif., which will specialize in electrical appliances and radio. J. Levine and S. Nigrosh are the proprietors.

Manufacturer Distributor

Phelps Dodge Divisions to Operate Under New Unit

Reflecting the prevailing trend towards increased specialization in industry came the announcement last month of a completely new alignment of the fabricating subsidiaries of the Phelps Dodge Corp. A new unit, the Phelps Dodge Copper Products Corp., is launched as the backbone of the new complete "mine to market" organization.

The name of the present fabricating subsidiary, National Electric Products Corp., will hereafter be the corporate title of the National Metal Molding Division of the company only. National Electric Products Corp. will have its headquarters at Pittsburgh, and be under the direction of W. C. Robinson, president. Its plant is at Ambridge, Pa., and among the many products of national distribution which it manufactures are rigid and flexible steel conduits, metal molding, armored cable, non-metallic conduit, thin-walled tubing and ovalduct, steel outlet boxes and switch boxes, rubber-covered wires and steel-protected cables.

The newly organized unit, Phelps Dodge Copper Products Corp., which will be headed by Wylie Brown as president, will take over and operate the other fabricating divisions of the company's business. These include the American Copper Products Division with mills at Bayway, N. J., manufacturer of copper rods, wire and strip, bus bars and special shapes, stranded cables, trolley wire, bronze and brass wire, and weatherproof wire; the British American Tube Division with mills at Bayway, N. J., manufacturer of brass, bronze and copper pipe and condenser tubes; the Inca Manufacturing Division at Fort Wayne, Ind., manufacturer of enameled copper wire, coils, magnet wire; and the P-M-G Metal Division, manufacturer of copper and copper alloys in fabricated shapes.

Habirshaw Cable & Wire Corp., of which Wylie Brown is also president, will operate as a subsidiary of Phelps Dodge Copper Products Corp. Habirshaw has plants at Yonkers and Nepperhan, N. Y., and Bridgeport, Conn., and manufactures a complete line of rubber and lead covered copper wires, paper insulated power cables, telephone and telegraph wires, signal wires, parkway cables, and miscellaneous cables of all kinds.

Through acquisition of the Calumet and Arizona Mining Co., and prior acquisition of the Nichols Copper Co. and the National Electric Products Corp., Phelps Dodge Corp. is one of the three large units in the copper industry in the United States. Its operations extend from mine to market, and a large part of its copper production is sold in fabricated forms.

Pacific Wholesale Now Leigh Borden, Inc.

Leigh Borden, Inc., is the new name selected to replace that of Pacific Wholesale, Ltd., southern California wholesale distributor for Sparton radios and electric refrigerators, according to announcement of Leigh C. Borden, president and general manager. The change in name closely followed the appointment of Mr. Borden as president and general manager of the distributing company, announced last month in ELECTRICAL WEST.

"Besides taking this new name we also have enlarged the personnel of our organization so that we are now in the best position possible to render maximum dealer service to Los Angeles and the surrounding territories," Mr. Borden said.

Since the introduction in southern California of the new Sparton refrigerators in February, and the new Sparton radio models, the business of the distributing company has gained considerably, sales for late February and early March being 30 per cent ahead of the same period last year, Mr. Borden said.

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DISTRICT MANAGER FOR ELECTROCHEF—A. H. Jaeger, general sales manager of Electromaster Inc., Detroit, announces the appointment of Louis R. Swenson of Los Angeles as district manager for the sale of Electrochef ranges on the Pacific Coast. Mr. Swenson has resigned as sales manager of Thor Pacific Co. to engage in his new duties.

Frigidaire Holds Annual Spring Sales Rally

From all over northern California 350 Frigidaire dealers and dealer salesmen came to the St. Francis Hotel on March 14 to attend the annual spring sales rally of the Frigidaire Corp. and to meet R. G. Hutchison, new Pacific Coast regional manager, and C. C. Lee, northern California district manager.

Much of the plans, quotas and sales story were told by talking pictures brought from the factory at Dayton, Ohio, by Geo. F. Jones, public utilities manager for Frigidaire, G. W. Shane and Fred W. Beecher.

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CLYDE CHAMBLIN HANDLING DUPLEXALITE—Representation in the San Francisco Bay area of the entire commercial line of Duplexalite suspension fixtures manufactured by The Miller Co., Hartford, Conn., has been taken over by the California Electrical Construction Co., San Francisco, of which Clyde L. Chamblin is president. G. J. Raab, who formerly handled sales of the Duplexalite line in the Bay territory, has joined the California Electrical Construction Co. and will be in charge of Duplexalite sales.

TWO NEW AUTOMATIC WASHER DISTRIBUTORS—Stubbs Electric Co., Portland, and Homer King, Inc., Tacoma and Seattle, have been appointed distributors in their respective territories of the washers and ironers manufactured by The Automatic Washer Co., of Newton, Iowa.

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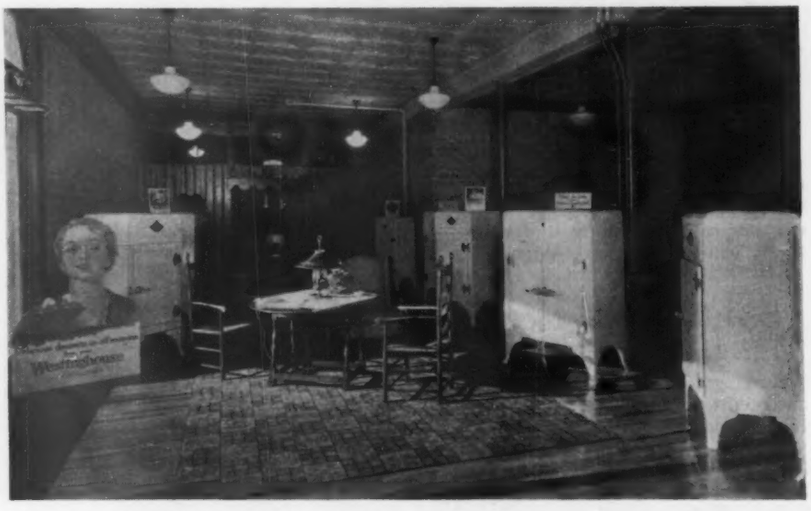
Denver's New Westinghouse Store



WESTINGHOUSE Electric & Mfg. Co. has opened this home-like retail store in Denver under supervision of the Intermountain Appliance Co., which recently took over distribution of Westinghouse merchandising lines in the Rocky Mountain area. Known as the Household Appliance Co., the new establishment is in charge of Tom Savage and the Marshall brothers, Willis M. and Ray F., all native sons of Denver. The proprietors say that although all Westinghouse lines are to be retailed, electric refrigerators will be their special feature.

The store, 36 by 2 ft. is illuminated by 14,000 watts of electric light and at night it becomes a spectacular "show place" in the heart of Denver's downtown business district.

All-Electric Kitchen Launched by G. E.

The "All-General Electric Kitchen" is now being featured by the General Electric Co., and full-page advertisements addressed to "the 2 million users of General Electric refrigerators and ranges" are appearing in the national magazines. Included in the kitchen's equipment are a refrigerator, range, dish washer, ventilator, lighting, electric clock and several small appliances. By those customers who already own a General Electric refrigerator or range the rest of the appliances may be purchased for as little as $4 a week, the advertisement states. A model kitchen containing all the equipment has been set up in the headquarters of the General Electric Refrigeration Department at Cleveland, Ohio.

Complete "All-General Electric Kitchens" are now being installed in several homes now being built in San Francisco, according to L. H. Bennett, president of The L. H. Bennett Co., northern California distributor of General Electric refrigerators, ranges and water heaters.

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Standard Conducting Range-A-Week Campaign

The Standard Electric Stove Co., Toledo, Ohio, is conducting a sales activity which it calls its "Range-A-Week" campaign. Each dealer handling Standard ranges is asked to set a minimum quota of a range a week per salesman. Dealers must display Standard ranges on their sales floors and in their windows; the manufacturer circularizes prospects, arranges range demonstration dates, furnishes consumer mailing pieces and prospect cards and assists in the preparation of the sales plan.

The Standard company recently appointed Home Electric Co., Tacoma, to serve the western Washington territory and H. E. Saviers & Son Co., of Reno, Nevada, to handle business in western Nevada and eastern California.

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Western Pipe & Steel and Blaw-Knox Unite on Sales

Western Pipe & Steel Co. of California and Blaw-Knox Co., of Pittsburgh, Pa., have announced the formation of a new subsidiary, Blaw-Knox & Western Pipe Corp., to handle sales of the Blaw-Knox Co.'s products on the Pacific Coast. Howard G. Tallerday, president of Western Pipe & Steel Co., has been made president of the new organization, which started operations March 1. The subsidiary is financed by both concerns on a fifty-fifty basis.

Manufacturing of Blaw-Knox products for Pacific Coast distribution will be done at the Western Pipe & Steel Co.'s plant in South San Francisco. This will add the following new products to Western Pipe & Steel Co.'s output: transmission towers for high tension lines, radio towers, specialties for high temperature furnaces, electro-forged steel grating, general contractors' equipment, steel plant equipment, steam purifiers, gas cleaners and other items.

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West Meets East

Gordon Prentice (right), western Washington distributor of General Electric refrigerators, comparing conditions, East and West, with Charles Gould, Portland (Me.) distributor, at the fifth annual convention of the G. E. Refrigeration Department at Coral Gables, Fla., in February. The convention was the opening gun of the war on Sales Resistance now being waged by the mythical land of Refrigerania

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O. J. MENKER, former assistant regional comptroller for the Frigidaire Corp., with headquarters in Oakland, Calif., has been appointed district comptroller in the Northwest district office at Portland. R. E. Drake remains as district sales manager for Frigidaire in the Northwest, reporting to H. L. Harbison, newly appointed Northwest district manager.

WAGNER-PETERSON CORP., 53 Fourth St., Portland, has been appointed representative of the W. N. Matthews Corp., St. Louis, Mo., for the territory consisting of Oregon, Washington and a part of Idaho. Jacques Wagner, of Wagner-Peterson, has been associated with the W. N. Matthews Corp. for the past year.

A CORRECTION—Charles A. Robertson, Western district manager, Novo Engine Co., Lansing, Mich., will continue to maintain his headquarters at 923 Irolo St., Los Angeles. ELECTRICAL WEST in February erroneously reported Mr. Robertson's return to the company's factory at Lansing.

HOFFMAN SPECIALTY CO. OFFICERS ELECTED—The following officers of the Hoffman Specialty Co. of California, Ltd., Los Angeles, manufacturer of the Hoffman Thermador, were elected at a recent directors' meeting: President and treasurer, George D. Hoffman; vice-president and general manager, Wm. E. Cranston, Jr.; secretary, James D. Wyman. Lloyd A. Bartlett is district sales manager and R. O. Webster and D. B. Kirby are sales engineers.

Market Review

California and Intermountain—

BUSINESS has recorded a new low level during this past quarter and although orders and even sizable orders are being placed, the effect has been to freeze up much new building construction and even maintenance material until some definite improvement is noted. Building construction to date shows decreases of 45, 50 and 70 per cent over last year for Los Angeles, San Francisco and Oakland respectively, and may go even lower because the government, which has been the backbone of building during 1931, has halted $20 millions of work. Half of this is in the Los Angeles area and the other half includes 20 scattered post offices in a 100-mile radius from the Bay area. The San Francisco and Oakland $6 million program, however, is not affected.

Power company purchases have aggregated about two carloads of assorted pole-line hardware each for northern and southern California, two carloads of butt-treated poles, and a carload of crossarms for the Medford (Ore.) area, and considerable machinery, especially line transformers. Outstanding orders recorded by various manufacturers during the past month include $2,000 of reactors for San Francisco, $15,000 of G. E. oil circuit breaker parts for Bay area stock, two 96-kva. Westinghouse induction regulators, value $5,000, for the Stockton area, one each 1,500- and 3,000-kva. Westinghouse auto transformers, value $15,000, for the Sacramento district, miscellaneous oil circuit breaker parts, value $5,000, for a San Joaquin substation, and Moloney transformers totaling $18,000 and including 21 sizes, 3- to 25-kva., for the Fresno area, 85 sizes 3- to 50-kva. for southern California, and nine sizes 75- to 1,000-kva. for the central California area.

High-tension insulator sales included one carload of Jeffrey-Dewitt for Fresno and two carloads of Westinghouse 60,000-volt pin type for central stock. In April Los Angeles will receive proposals for approximately $20,000 in high-voltage insulators for the forthcoming fiscal year, and the City of Vernon (Calif.) will purchase $75,000 of switchboard and switchgear material to complete its municipal

plant, which should be in operation by this December.

Industrial business exhibits marked improvement, recent orders including $2,500 Westinghouse motors for a marble works, motors and gears, value $6,000, for a California dredge, $14,000 of Westinghouse electric equipment for an export dredging outfit, a speed reducing paper machine drive, value $3,000, and a G.E. turbine, transformer and motor equipment, value $85,000, for a potash plant.

Industrial, too, is much of the material recently shipped to Hawaii, including a capacitator for plantation power factor control and a $2,500 G.E. generator switchboard.

Railroad business, outside of dry batteries and small lots of wiring material, is practically non-existent. Government orders include $6,000 of Westinghouse switch gearing for the Sunnyvale dirigible hangar, while start of active work on the $20,000,000 cruiser at Mare Island has brightened the Vallejo area.

Dealers' and contractors' business totals a fair amount but markets are weaker, with low gross profits and small quantities. Collections hold up well.

Pacific Northwest—

LUMBER prices are said to be lower than at any time since 1916 and the industry is operating at from 22 to 23 per cent of capacity. During the latter part of March, of the mills reporting to the West Coast Lumbermen's Association, 177 units were reported as shut down and 45 operating, with the latter running mostly on short schedules. A canvass of the industry in Washington and Oregon shows that over 80 per cent of the total capacity will not exceed a monthly production at the rate of 36 hours per week, or three-quarters of one regular shift, between now and July 1, 1932. Inquiries for electrical equipment, motors and control apparatus from mills and logging camps are extremely light and sales are at an absolute minimum, purchases being for necessary replacements only.

During March, Seattle jobbers reported movement of all electrical apparatus, equipment and accessories at rock bottom. Orders placed and announced for the month included: approximately 50 transformers from 5- to 50-kw. and about 200 meters from 5- to 50- amp. to central stations; less than $5,000 worth of miscellaneous switchgear to similar sources; 100 motors, from 100 hp. down, to lumber mills, allied woodworking plants and scattered industrials; 50 motors from 20 hp. down, to agricultural sources, irrigation districts and municipal water systems; 10 machines, from 10 hp. down, to scattered industrials, and 10 motors, ranging from 2 to 5 hp., to a mill in Alaska. U.S. Penitentiary at McNeil's Island on March 24 opened bids for 12 motors ranging from 7½ to ½ hp. and for three outdoor switches and eleven surface cabinets, and Great Falls, Montana, opened bids on March 21 for approximately $11,000 worth of motor control equipment, including volt line panels, feeder circuits and control panels for a municipal water system.

Movement of electric ranges, washing machines and domestic appliances is said to be the lowest in months with no indications of improvement in sight; also, it is stated, collections for this merchandise sold on the installment plan, in many cases, are impossible to make. Reverts on ranges and radio are said to be exceedingly high.

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Barometer

DURING the past six months the average of industrial activity in the West has fluctuated within comparatively narrow limits, with a moderate upward trend. February returns of electrical energy consumption in various kinds of manufacturing plants show greater activity than in December, but 2.5 per cent less than in January.

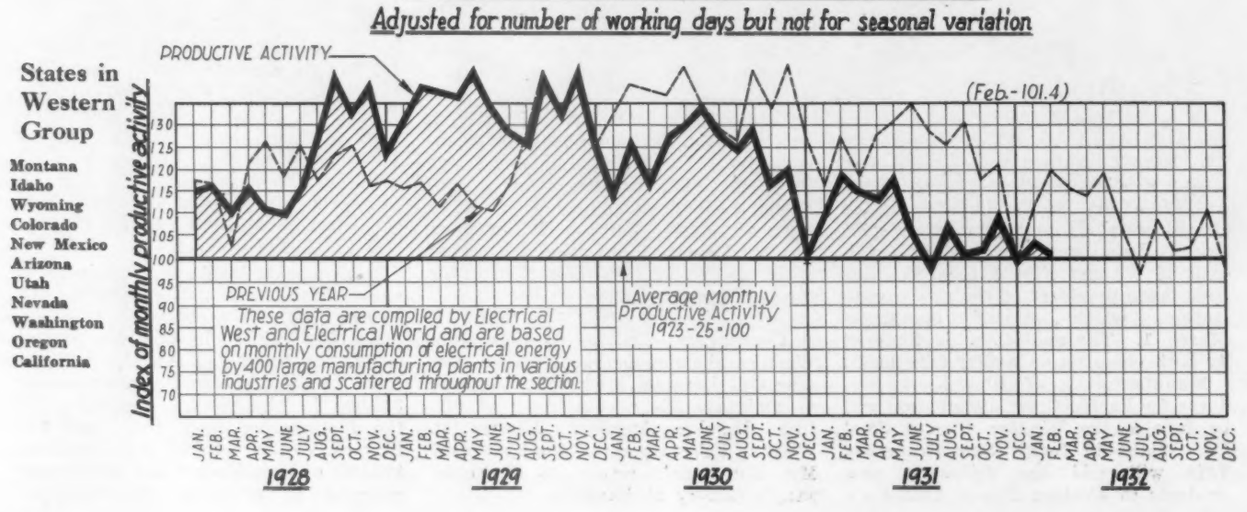
The new index is 15 per cent lower than the index for February, 1931; the decrease must, however, be viewed in the light of what has gone before: In the early part of both 1930 and 1931 the general trend was downward; now it appears to be upward.

By industry groups the changes from January were generally small. Compared with the corresponding month of 1931 all groups except chemicals are down. The metals industry continues to be conspicuously low. The stone, clay and glass industry, including the manufacture of cement, declined somewhat, in contrast with the rise last year of 14 per cent from January to February.

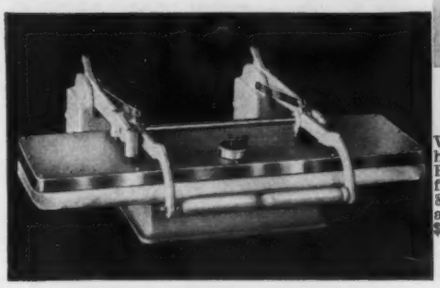
Indexes of Manufacturing Activity in the Western States

(All figures adjusted for number of working days)

	February, 1932	January, 1932	December, 1931	February, 1931
All industry	101.4	104.0	98.3	120.0
Chemicals	89.0	92.0	88.3	85.7
Food	127.0	129.0	134.4	149.3
Forest products	135.2	136.0	124.8	146.0
Metals group	40.8	45.3	32.7	74.4
Paper and pulp	122.5	121.0	110.6	128.3
Rubber	98.1	103.7	53.7	173.0
Shipbuilding	87.4	96.7	87.8	106.6
Stone, clay and glass	78.5	83.5	79.9	106.0



New Products



Flat Plate Ironer

A new type flat plate ironer has just been put into quantity production by Permo Products Corp., 4311 Ravenswood Ave., Chicago.

With this ironer, ironing and pressing are accomplished with one motion—as the manufacturer puts it, "it slides as it presses." An automatic sliding action of the ironing plate puts the sheen of hand ironing on linens and another feature compensates for contact of French knots, embroidery and all raised surfaces, which come through perfectly according to the manufacturer.

The ironing board measures 10x26 in., providing 260 sq. in. of ironing surface. It is of a self-compensating type that evens contact with garments thicker on one end.

Thermostatic heat control permits regulation to any desired variation of heat. A Chromalox heating unit is used. Base of the ironer is of cast aluminum, insuring light weight and portability. Also available is a steel kitchen table that completely conceals the ironer and folds like a typewriter desk. Ironer and the table are enameled and all fittings are chromium plated. —ELECTRICAL WEST, April 1, 1932.

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Everhot Water Heater for Off-Peak Rates

A new type F-2 twin safeguard electric water heater, designed especially for use on off-peak water heating rates, has just been introduced by the Everhot Electric & Mfg. Co., 116 Llewellyn St., Los Angeles. The type F-2 is made in a wide range of sizes from 32 gal. up and is finished in an attractive selection of colors. Dual heating units with dual control combined with a quick-heating circulation principle are used.

A novel feature of this heater is an automatic protective switch to prevent overheating if the heating unit or its pipe connections should become clogged through lack of flushing out of excess sediment, scale or other foreign material.

Thorough heat insulation is provided and temperature control is achieved by two simple and durable thermostats mounted on the storage tank.— ELECTRICAL WEST, April 1, 1932.

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EVEREADY FLASHLIGHTS—National Carbon Co. has just announced two additions to its line of Eveready flashlights. One of them, N. 2,640, is a two-cell tubular light, while the other, No. 2,617, is a two-cell focusing spotlight. Fittings for both lights are nickel plated. The heavy brass cases are finished in durable black. List price of No. 2,640 is 49 c., while No. 2,617 lists at 75 c.—ELECTRICAL WEST, April 1, 1932.

Colonial Clock

This new Sheraton Colonial clock with Westminster chimes and Telechron motor has just been placed on the market by the Revere Clock Co. Walnut lacquer is used for the finish of the clock which measures 8 in. high, 18 in. wide and 5¼ in. deep and has a raised numeral dial. It sells for $35 retail.—ELECTRICAL WEST, April 1, 1932.

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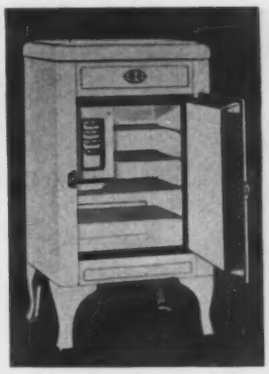
Apex Washers

Two new washer models, one a wringer-type and one wringerless, have been announced recently for sale in the West by The Johnson Washer Co., Oakland, Calif., subsidiary of The Apex Electric Mfg. Co., Cleveland, Ohio.

Apex No. 25 is a low-priced wringer model with motor-driven pump. A tub 14¾ in. deep and enameled inside and out in white vitreous porcelain is a feature of this washer. Its Lovell power wringer is nickel plated and equipped with oversize balloon rolls and silent-mesh cut-steel gears. Retail price, $99.50.

The new Apex S4 model is a two-tub wringerless washer embodying practically all important features of former models, yet is priced at nearly 30 per cent less. Both washing and extractor tubs have seamless interiors finished in white vitreous porcelain. The exterior of the tubs is the same, with green lacquer trim. The washer's power driven pump drains either tub through a goose-neck drain hose. Revolving of the extractor basket is automatically started and stopped by opening and closing the combination safety cover and drainpan. Retail price, $149.50.—ELECTRICAL WEST, April 1, 1932.



Sparton Refrigerator

Three sizes are offered in the new line of electric refrigerators brought out by the Sparks-Withington Co., Jackson, Mich., manufacturer of "Sparton" radios. These three sizes provide 7, 5½ and 4½ cu. ft. of food storage space respectively.

The new refrigerators have flat tops low enough to be easily reached, semi-concealed hinges and a new type of sure-closing door latch. Bar-type shelves are used throughout to provide for the removal of dishes without spilling. Main food shelves in the two larger models have special patented supports that permit their being pulled out 10½ in. without any danger of tipping or dropping. Ample beverage space is provided in all models.

Doors are all rubber-sealed and bear two decorative medallions. The eight-graduation cold-control dial and separate stop and start button are mounted in top panel.

The mechanical unit is compact and easily installed. Fan belt is eliminated.—ELECTRICAL WEST, April 1, 1932.

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Explosion-proof Starter

Cutler-Hammer, Inc., 234 North 12th St., Milwaukee, Wis., announces a new explosion-proof, across-the-line type a.c. automatic starter, designed in accordance with the specifications of the Underwriters' Laboratories for class 1, group D hazardous locations. This new starter is of the air-break type, there being no oil tank.

The construction of the starter proper consists of a standard 3-pole, magnetic contactor, with thermal overload relays to protect the motor from burnout occasioned by overloads. The enclosing case is of the "split" type, allowing easy access to all parts of the starter. Extra wide and accurately machined flanges are provided between the cover and case. These starters are designed in three sizes to take care of motors up to 30 hp., 220 volts; and 50 hp., 440 or 550 volts.—ELECTRICAL WEST, April 1, 1932.

Moraine Refrigerators

A new line of Moraine refrigerators, to sell in the West from $149.50 to $202.50, has been brought out by the Frigidaire Corp., Dayton, Ohio. The new models carry the Frigidaire nameplate and will be sold through present Frigidaire outlets and by additional dealers who will be given franchises in the near future. A three-year guarantee is given with each unit.

Although the new cabinets occupy less floor space, proportionately they afford more food storage space than regular Frigidaire models. The smallest has 6.8 sq. ft. of shelf area and the largest 12.2 sq. ft., and they range in approximate capacity from 4 to 6 cu. ft.

Five coats of white Duco (two prime and three finishing) are used on the steel exterior of Moraine cabinets for a finish. The interior finish is the same in all Frigidaires—acid-resisting porcelain-on-steel—and hardware is chromium plated. The freezing compartment has a porcelain front, and the ice trays, which in the smallest models make 30 cubes (4 lb. of ice) at a time and 42 cubes (6 lb.) in the larger models, are made of rust-resisting aluminum. The top shelf in each model is a flip-over type and provides for the storage of tall bottles.

According to the manufacturer, the new Moraine models represent the best equipment that Frigidaire engineering and manufacturing divisions have been able to produce in the lower price range without the sacrifice of structural features which they regard as necessary to performance and lasting satisfaction. — ELECRICAL WEST, April 1, 1932.

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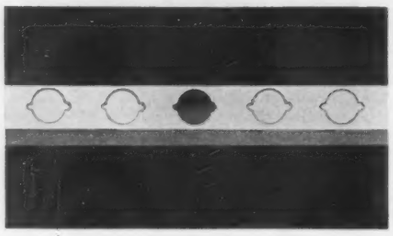

Knock-Out Strip

A wiring duct or conduit, known as Permaflector knock-out strip, has been developed by the Pittsburgh Reflector Co., Pittsburgh, Pa., for unit assembly of reflector type illumination equipment. The strip consists of two main parts,—the face and the back. The face is provided with suitably shaped knock-outs spaced 3 in. on centers, providing for quick installation of sockets on any desired spacing. The back fits closely over the face covering three sides of the strip, assuring ample protection to the wiring.

Permaflector knock-out strip is 1 27/32 in. square and is furnished in standard 10-ft. lengths. The material used is corrosion-proof and is finished in silver colored satin finish. A knock-out joint is provided, making it possible to turn corners vertically as well as horizontally. Accessories include sockets, joints, couplings, ends, brackets, U-straps, hangers, fitters, hubs and knock-out boxes.—ELECTRICAL WEST, April 1, 1932.

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Vertical Motors

Vertical motors now being manufactured by Century Electric Co., St. Louis, Mo., in sizes from 1 to 150 hp., are ball bearing, grease-lubricated, mounted on a ring base or directly on the driven equipment, as required. The top bearing bracket of these type R d.c. motors is protected with a cover and may be furnished either open or with screen or solid covers to meet surrounding conditions.—ELECTRICAL WEST, April 1, 1932.

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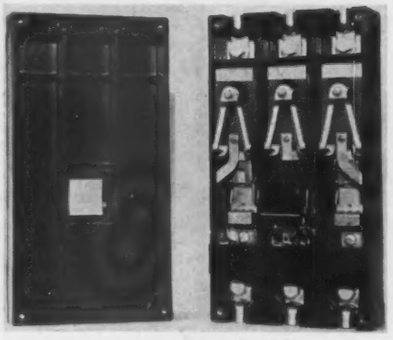

"De-ion" Circuit Breakers

A new line of circuit breakers of the smaller sizes, utilizing the de-ion principle of circuit interruption, is announced by the Westinghouse company. These new breakers, in ratings of 15 to 600 amp. at 250 and 600 volts a.c., 125 and 250 volts d.c., are intended for applications where fused entrance switches, smaller circuit breakers and similar devices have previously been used for lighting and power circuit protection. The designers assert that the de-ion principle of arc extension makes possible heretofore unattainable compactness in this type of apparatus.

This same feature permits extremely high interrupting capacities up to a maximum of 10,000 amp. for a nominally rated 225-amp. circuit breaker. The circuit breakers are entirely enclosed and present a neat appearance both in the individual and switchboard mountings.

Construction features include positive position indication, quick make and break, heavy duty silver-to-silver contacts protected by silver tungsten arc tips, and a double protection against overload through the use of two entirely separate tripping functions of the overload units. Independent inverse time and magnetic instantaneous tripping is provided. These breakers are said to permit economies in panelboard service for buildings, homes, and industrial plants by eliminating fuses, service being restored by merely flipping the handle from the trip position.

Pamphlets and bulletins describing this development in detail are available from the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.—ELECTRICAL WEST, April 1, 1932.

Aluminum Welding Electrode

The Lincoln Electric Co., Cleveland, Ohio, announces a new electrode for welding aluminum which will be known as "Aluminweld." The new electrode is a 5 per cent silicon aluminum alloy and can be used for welding sheet or cast aluminum. It is designed for either metallic or carbon arc welding. Provided with a coating which prevents excessive oxidation, it will dissolve any aluminum oxide that might be formed. The manufacturers claim that the coating assists in giving a very smooth operating arc which is particularly essential in welding aluminum.

Aluminweld is produced in four sizes, 3/32-in., 1/8-in., 5/32-in. and 3/16-in. in 14-in. lengths.—ELECTRICAL WEST, April 1, 1932.

Trade Literature

¶ METER EQUIPMENT—Meter test blocks and cabinets manufactured by Meter Devices Co., Canton, Ohio, to conform with a new metering sequence are illustrated and described in a recent catalog addition issued by that company.

¶ STARTERS AND CONTROLS—New and revised bulletins and price sheets have just been issued by the Allen-Bradley Co., Milwaukee, Wis., covering its automatic starters, drum reverse switches, multi-speed drum controllers, slip-ring drum speed regulators, treadle-operated controllers and a.c. speed regulators.

¶ ELECTRIC FANS—Bulletin No. 42 of the Century Electric Co., 1806 Pine St., St. Louis, Mo., illustrates and describes the company's line of stationary, oscillating and ceiling fans. Every feature of the fans is given detailed presentation.

¶ CHAINS AND SPROCKETS—A 112-page catalog and engineering data book recently issued by the Chain Belt Co., 1600 West Bruce St., Milwaukee, Wis., gives prices, weights and complete information on the design and application of Rex roller chains, block chains, leaf chains and cut-tooth sprockets.

¶ RANGE CATALOG—Electromaster Inc., 1803 East Atwater St., Detroit, has issued its 1932 Electrochef catalog, which contains illustrations and description of four range models, a cooking table, oven, firebowls and accessories.

¶ CEILING FANS—The airplane fan line being manufactured by Dallas Engineering Corp., 1115 Hall St., Dallas, Tex., is described in literature now being distributed by the manufacturers. A comprehensive sales manual and catalog has been issued for dealers, and newspaper ads, mats, postcards and sales letters also have been prepared for their use.

¶ VOLTAGE REGULATOR—Ward Leonard Electric Co., Mount Vernon, N. Y., has just issued bulletin No. 5501 covering a line of constant wattage voltage regulators for eliminating the distortion and inaccuracies of photo-cell devices resulting from voltage fluctuation. These regulators are for unity power factor loads from 10 to 100 watts.

¶ MOTORS—Wagner Electric Corp., 6381 Plymouth Ave., St. Louis, Mo., has issued a new 22-page, loose-leaf bulletin on squirrel-cage motors. The bulletin, No. 174, describes the seven types of squirrel-cage motors, gives application tables, speed-torque curves, complete construction details.

¶ G. E. PUBLICATIONS—Recent publications of the General Electric Co., Schenectady, N. Y., include:

GEA-1123A: Outdoor Switching Equipment (fuse disconnecting switches, fuse units and current-limiting resistors).

GEA-1523: Airport Lighting Equipment (complying with airport rating regulations of U.S. Department of Commerce, Aeronautics Branch).

GEA-1262B: G-E Thrustors.

GEA-1372A: G-E Electric Steam Generators.

GEA-885B: The G-E Super Synchronous Motor.